NOVEL BUILD-TO-RENT STRATEGIES FOR SINGLE FAMILY HOMEBUILDERS

A Thesis
Presented to
The Academic Faculty

by

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In Partial Fulfillment
of the Requirements for the Degree
Masters of Science in Building Construction and Facilities Management in the
School of Building Construction

Georgia Institute of Technology

May, 2014

NOVEL BUILD-TO-RENT STRATEGIES FOR SINGLE FAMILY HOMEBUILDERS

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ACKNOWLEDGEMENTS

This thesis would not have been possible without the generous support of my thesis committee, friends and family. In no particular order, I would like to thank Kayla Myers, Phyllis Myers, Rob Myers, Tyler Myers, Joe Doyle, Dr. Javier Irizarry, Dr. Debbie Phillips, Rick Porter, Jackie Strickland, Dr. Vivek Sah, Michel Satterfield, and Mike Brown.

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LIST OF SYMBOLS AND ABBREVIATIONS

BTCF	Before Tax Cash Flow
BTER	Before Tax Equity Reversion
Cap Rate	Capitalization Rate
CPI	Consumer Price Index
DS	Debt Service
EGI	Effective Gross Income
IPO	Initial Public Offering
NAHB	National Association of Homebuilders
NOI	Net Operating Income
OFHEO	Office of Federal Housing Enterprise Oversight
PGI	Potential Gross Income
REIT	Real Estate Investment Trust
REO	Real Estate Owned
SFD	Single Family Detached (Home)

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SUMMARY

Following the recession of 2007-2009, conditions in the housing and finance industries favored an increase in renter occupied homes relative to owner occupied homes. With rental properties comprising an increasing share of the housing supply, the home building industry should consider housing products that meet the needs of renters. This thesis proposes a build-to-rent product for single family home builders, to be offered as a complement to the traditional built-for-sale product. The purpose of the research is to demonstrate that a build-to-rent product is financially feasible under ordinary market conditions. In order to determine the viability of a build-to-rent product under likely market conditions, a financial model has been developed for a single family build-to rent product. The research involves reviewing the literature related to similar investment product types in order to develop a business model for the proposed build-to-rent product. The proposed model utilizes financial parameters currently in the industry, respectively, in the analysis of homebuilding projects and rental property investments. Using the analytical methods used for analogous investment classes, the author calculates a projected market range of input variables for the model. Sensitivity analysis of the model was then used to test the financial feasibility of a build-to-rent product. The analysis showed that the proposed product would be feasible under ordinary market conditions. Additional recommendations for future research has been explored based on the findings of this study.

CHAPTER 1: INTRODUCTION

1.1 Introduction to the Single Family Housing Industry

The traditional single family home market has been dominated by the owner-occupied home. The construction, marketing and planning of the single family housing product has always been based on catering to this model. During the recovery from the recession of the late 2000's a new trend has emerged which has the potential to affect the entire economic model surrounding single family housing. Restrictive credit conditions for consumers, low interest rates, and a glut of supply and depressed prices, have all contributed to an increasing segment of the market controlled by large capital investors owning homes for the purpose of renting (Altisource, 2013). Prior to this occurrence, the rental home business was predominantly conducted by small local firms and individual investors. However, as large capital investors have sought greater returns in a challenging environment, there has been an increasing interest in single family homes as an investment asset class (Dymi, 2011; Duncan, 2013). In 2012, the first institutional real estate investment trusts, or REITs, dedicated to single family home investment were established. As of mid-2013 three single family REITs have conducted an initial public offering, while several others are funded with private equity (American Residential, 2013; Whelan, 2013; Stoller, 2013)

The investment in, and rental of, single family homes is a well-established business practice. Over 11 million single family detached homes are rented in the United States (American Fact Finder US Census, 2013). A further 10 million small properties of

two to four units are rented as well (American Fact Finder, 2013). However, historically, the practice of building single family homes expressly for rental has been less widespread. According to US Census data, over the last 20 years less than 3 percent of single-family detached homes have been built for the purpose of offering as a rental (American Fact Finder, 2013). In the wake of the collapse of the housing industry in the late 2000s, homebuilding firms and investors have sought alternative business opportunities. In this environment, build-to-rent is becoming more common. Over 5 percent of homes built in 2012 were intended for the rental market (American Fact Finder, 2013). Traditionally, renting a newly constructed home has been seen as a last resort when the home has failed to sell. However, during the extended depressed market since 2008 some home builders have considered leasing as an alternative to marketing for sale (Dymi, 2011). Taking advantage of depressed home prices many investors took the opportunity to purchase single family houses for rental property. However, as the inventory of unsold properties has declined, an opportunity to build housing expressly to function as rental property has emerged. The business of build-to-rent, while historically unpopular, is a growing trend in the residential construction industry.

These market changes will impact the way homebuilders and residential developers must structure their business. If a housing product built for leasing is feasible, homebuilding firms may choose to participate in the market. Likewise, if institutional owners, or even mid-sized investors, become a major factor in the market for single family homes it will be necessary for homebuilders to consider their needs in their market analyses. The most direct potential effects will be if builders choose to rent new homes, rather than offer them for sale. Anecdotally, many homebuilders are already selling new

homes to investors (Kritzer, 2013). Builders who have been able to purchase distressed developed lots have been able to offer new homes at a competitive price relative to the foreclosure market. However, there are no reports in the literature of home building firms getting involved in the rental market supply directly through building homes for rent. As build-to-rent single family rental product has very limited sample at present, baseline values for analysis of the market have not been established in the literature.

This research will examine and compare the relative returns on investment for an emerging business focused on building single family homes for the purpose of renting. For comparison, industry benchmarks and data are available for the build-for-sale single family home product line. In order to predict the function of a built-for-rent product type this research uses similar and related products develop a model of the build-for-rent product. The research will then establish the requisite conditions which will allow such a product to be viable. If these conditions only exist in extreme circumstances, such as the recovery from a generational downturn, then the asset class will not be a viable business model for homebuilders moving forward. However, if the key conditions that will allow success are those which may exist over the long term then such a product may be a viable complementary, business for homebuilders.

1.2 A Build-to-Rent Housing Product

From the 1950's until 2007, housing market conditions in the United States generally favored home ownership (Schmitz, 2004). Mortgage loans were readily available to middle class families at reasonable rates throughout the period. The federal government backed secondary mortgage purchasing organizations to provide liquidity and stability to the mortgage market. Further, during the latter half of the twentieth century, sustained economic growth was the norm, providing the societal wealth and resources necessary to expand home ownership numbers. From the end of the Second World War, the business of developing land, building homes and selling those homes to owner-occupiers was a viable practice. Homebuilding for sale, at its core, is a straightforward business. The builder purchases a land lot, builds a marketable home and sells that home to the end user. The trade in lots and homes can to some degree be commoditized and standardized. The option to rent the completed homes, rather than sell them, was always present but was generally viewed as a last resort when the home failed to sell in a timely manner.

The major differences in the build-to-rent product, versus more traditional products, can be classified into two categories. Compared to build-to-sell, the homes are rented rather than sold. Compared to typical rental properties, the homes are new construction rather than properties acquired through distressed sales.

Each of these categories presents challenges and opportunities. On the positive side of renting versus selling, leasing a home can be easier than selling it. As tenants have significantly less invested in a rental than a home owner does in a home, prospective

renters are less apprehensive than prospective purchasers. However, on the negative side, managing a rental a home can be significantly more complex than selling it. Further, home building is a relatively capital intense business activity and there is a need to ensure return of capital in a timely manner. A rental business model requires a long-term outlook, continual management over the ownership period, and maintenance requirements that are not present when immediately selling completed homes. So long as building homes to sell remained a viable and stable business, few, if any, builders took on the additional burden and risk of engaging in build-to-rent business. Few, if any, builders considered renting their produced homes as an alternative to sale.

The second category of differences are those arising from the rental of new construction versus distressed properties, there are also opportunities and weaknesses to each. New homes generally have lower operating costs. Additionally, a new home constructed by the lessor is unlikely to have unexpected costly structural or mechanical defects. Homes bought at distressed sales can have defects that require major capital investments. Single family real estate investors focused on acquiring pre-owned homes at reduced cost for renting. Under the prevailing market conditions of most of the twentieth century, sufficient inventory of pre-owned homes existed to satisfy the demand of rental investors. Frequently, investors were able to purchase distressed properties below the new construction replacement cost. As new homes generally carry a premium over older homes few investors were in the market for new homes as rental product.

1.3 The Role of Build-to-Rent in Future Markets

Between 2005 and 2012, sales of new homes declined by 977,000 from a peak of 1,283,000 to a low of only 368,000 (US Census, 2013a). This was the most dramatic sustained downturn in the new housing market since the Great Depression. As of early 2014, although there is some indication that the market is returning to a level more consistent with a healthy market, the lingering effects of the financial crisis may put a lasting impediment on the ability of Americans to achieve homeownership. During the financial crisis the income needed to underwrite financing on a home purchase has risen, while inflation adjusted median income has fallen (US Census, 2012). Additionally, exceptional numbers of Americans have experienced a bankruptcy, foreclosure, job loss, or other economic hardship which has negatively impacted their credit history and borrowing ability. For these reasons, home ownership is currently out of reach for many Americans who would like to own a home. Demographic shifts are also impacting the demand for new homes. Young Americans are delaying marriage and having children to focus on careers. Also, more professionals want to remain mobile to pursue career opportunities in other cities and are hesitant to invest in purchasing a home that may not serve their needs long term. The long term outlook for home ownership is weaker than any point in nearly 70 years. However, every person still needs a place to live. If Americans do not own homes as they have in the past, they will likely be looking to rent homes. This presents an opportunity for single family home builders to supply a product that meets the new demand to rent, rather than own, housing.

Since 2007, a comparable economic situation has existed elsewhere in the world.

However, in the available literature, the only major example of a jurisdiction expressly promoting build-to-rent in the marketplace is Great Britain. During the financial crisis in Britain, the income needed to secure financing on a home purchase has risen drastically, while median income has fallen. For this reason, home ownership is currently out of reach for a majority of the British population. In some regions, only the top twenty percent of wage earners could qualify to purchase an average home (Donnell, 2012). As such, British government initiatives have been put in place to foster a build-to-rent housing industry. In December 2012, the British government established a £200 million fund to finance build-to-rent single family housing development (Kasmira, 2013; Prisk, 2013). The dual purposes of this fund are to jumpstart the homebuilding industry and also address a growing housing shortage. These issues are very similar to those being addressed in this research. These British programs focus on encouraging lease-to-own agreements, whereby the tenant is able to put a portion of their monthly rent toward the eventual purchase of the home they are leasing. This can be an effective response for customers who would like to buy a home, and have income to afford housing costs, but cannot currently qualify for financing.

From an economic viewpoint, homebuilders participate in the housing industry as suppliers. The macroeconomic indicators point towards an increasing demand for rental housing, as opposed to owner occupied housing. As demand changes for single family home building firms to maintain their market share of the supply for housing, they must find a way to supply a product that meets this demand. Build-to-rent products are a clear option for future home builders.

1.4 Research Objectives

With rental properties comprising an increasing share of the housing supply, the home building industry should offer housing products that meet the needs of renters. This thesis proposes a build-to-rent product for single family home builders, to be offered as a complement to the traditional built-for-sale product. The purpose of the research is to demonstrate that a build-to-rent product is financially feasible under ordinary market conditions. This research will examine the methods of financial analysis of similar products in order to determine the appropriate method of financial analysis for a build-to-rent product and also identify the types of data needed to analyze the proposed product using a financial model.

While economic and demographic conditions indicate that the market for rentals will be stronger and the market for home sales will be weaker, the parameters determining the financial success of single family detached rental housing have yet to be established. In the past, the build-to-rent business has never been consistent enough to support the determination of benchmarks for the industry. While the industry continues to grow, sufficient experience has not been gathered to define points of reference. The pioneering firms that are experimenting with this business model are using anecdotal experience and rule-of-thumb strategies to guide their decisions. For example, at present, there are not consistent standards for financing procedures or underwriting. Risk premium levels have not been established. Also, capitalization rates for assessing the values of single family detached income producing property are less established than other asset classes.

The objective of this research is to develop a financial model of a single family build-to rent product and to use the model to predict the market viability of the product under likely market conditions. Firstly, the background knowledge on the economics and business processes of the single family construction and rental industries will be examined to provide a basis for the analysis. Secondly, an appropriate method of financially modeling a build-to-rent product will need to be determined. The build-to-rent activity is a combination of two well understood business activities, constructing homes and renting homes. In order to create a comprehensive model incorporating both activities this research will use the accepted standards for construction financial analysis and income property analysis as a starting point. Thirdly, the key input parameters and outputs for each model will need to be examined to identify the points where the values of the construction portion of the model will flow to the rental portion of the model. Identifying the key input values for each portion of the model will allow the model to be developed incorporating these inputs. The fourth step will be to actually design the single family build-to-rent model. Next, the research will need to ascertain appropriate values for the input parameters which will be tested in the model. A range of values between the historical maxima and minima of the national averages for each of these values will be used for testing. Using this range of values will allow the greatest range of application of the results. Those value ranges will be used to conduct sensitivity analysis on the model. The results of this analysis will indicate the predicted bounds of the input parameters under which such a product can be successful or competitive in the marketplace. These ranges can be compared to expected market conditions as a valuable tool for decision makers in choosing whether to engage in the build-to-rent industry.

1.5 Research Assumptions and Limitations

The designed model will be a convenient tool for forecasting the financial success of a build-to-rent project. However, it is important to be aware of the limitations and assumptions of the model. The model is designed to simulate expected market conditions and the characteristics of a build-to-rent project. Much of the research is devoted to describing the bounds of the market conditions that determine the likely market environment. However, if the project conditions vary significantly from these parameters, whether in the overall market or for a particular project, the model will not have merit. Differences in financing structure, business strategy, tax considerations or the physical conditions of the property could have an impact on the investment return as large as any of the inputs to the model. Users should ensure that the conditions described in the model reflect the parameters of their project. The model is designed as a financial tool to aid in the planning of home construction projects. It is not optimized for risk or sensitivity analysis of the project on factors other than fluctuations in the input values. Costs such as property maintenance, dues and utilities are project dependent and are often influenced by weather, geography and economic factors. An unexpected change in any of these costs could impact the financial success of the project. The model does not account for this uncertainty. Users of the model should be cognizant of the potential impact of these factors. The models assume that the values of the key inputs will remain static throughout the life of the project. This is an assumption used in many financial models. However, these might vary between the initial year and the final year depending on changes in market conditions. In choosing an appropriate quantitative value for each input, a value reflecting the typical value expected over the life of the project should be used.

Additionally, the focus of the model was on the financial characteristics of a build-to-rent product. Risks not related to the internal financials of a build-to-rent project were not considered. Decision makers should be aware of the specific risks related to their project and plan accordingly.

CHAPTER 2: LITERATURE REVIEW

2.1 Build-to-Rent Economic Factors

This section discusses the business and economic environmental factors for the single family construction and rental markets that are likely to impact a build-to-rent project. The first section will discuss the economic factors affecting the supply of single family rental home construction, including construction funding, financing, funding for investment homes, lot value percentages, and the construction quality and cost for rental housing. The second section will examine the factors determining the demand for rental housing.

2.1.1 Supply Side Factors

2.1.1.1 Funding

Funding a build-to-rent project presents several challenges. Homebuilding is an activity that is very capital intense. The risky nature of real estate development increases the cost of capital for investments in the industry. Large institutional investors, such as REITs, must offer a significant potential return to attract capital to the industry. For smaller investment firms and homebuilders, debt financing is likely to be needed. Data from the National Association of Homebuilders shows that 83% of lending for residential projects is currently conducted through commercial banks (BUILDER, 2002). However, the lending products commonly available to homebuilders may not be appropriate for build-to-rent developments.

2.1.1.2 Financing for Homebuilding

Residential homebuilders generally take out loans to finance home building. The construction loans are part of a broader loan product type known as Acquisition, Development and Construction, (AD&C) loans developers use these loans to purchase raw land, conduct development work on the land to create individual lots, build infrastructure, and ultimately build homes on the subdivided lots (NAHB, 2012). Typical construction loans are secured by the asset being improved, the land or the homes. The loan can be tied to an individual home, a tract of land, or a series of assets. An issue with using typical construction loans to finance a build-to-rent project is that they are ordinarily issued as short term loans. Usually, the loans are anticipated to be outstanding for only six to eighteen months. The term of the loan depends on the anticipated construction time. Construction loans are intended to be paid off with proceeds from the sale of the home before the loan matures. Policies vary among lenders whether the loan will be renewed or called if it reaches maturity. However, construction loans are not structured to be viable as a long term loan.

Construction loans are taken out through a series of "draws". Each draw increases the balance of the loan and interest payments are assessed on the balance at periods agreed upon in the loan documents (DiLorenzo, 2006). Once the loan is fully drawn, at completion of construction, interest payments are at their highest. Making interest payments at this stage can be a very expensive prospect, for example while a completed home sits waiting to be sold. The interest payments continue until the home is sold. While a typical construction loan could be used to finance the construction of the home,

additional financing would need to be secured for the long-term leasing phase (NAHB, 2012).

Another consideration relating to construction loans is the relatively high financing costs. As construction loans are considered especially risky, banking regulations establish the maximum amounts lending institutions should lend on these types of loans. The limits are customarily tied to the ratio of the loan amount to the expected value of the completed project. On single family homes, the industry standard is that the loan amount should be no more than 85 percent of the anticipated appraised value of the finished home (Wedewer, 2006). Additionally, the lender will commonly require the builder to have a set percentage of equity invested in the project. Lenders prefer for the borrower to "have some skin in the game". The larger the amount of funds the borrower has invested in the project, the higher the incentive for the borrower to ensure the success of the project. If a borrower was able to finance one hundred percent of the costs of a project, the only risk they would have is the lack of profit is the project fails. If a borrower has equity in the project, they face losing their invested equity in addition to the loss of potential profits. Usually, a lender will require the homebuilder to fund a certain portion of the construction before releasing any funds. So, a builder constructing a home expected to be worth $200,000 on completion would be able to borrow up to $170,000 towards the construction (NAHB, 2012). If the cost of construction exceeds the funds available from the loan, the construction firm will be forced to fund the remainder from equity.

Additional costs of financing can include origination fees, processing costs, and inspection fees. These are typically amortized into the loan. Banks will often also charge

“points” up-front (NAHB, 2012). Points are origination fees assessed as a percentage of the loan. Points are paid at the commencement of the loan. They can represent a significant cost as they are assessed against the full approved loan amount (NAHB, 2012). This is in contrast to interest, which is assessed based on the outstanding principle. In typical construction loans, the payback of the principle occurs when the home is sold. If the builder is selling the homes to outside investors, this would not be an issue. However, if the construction firm is holding the asset for rent, an alternative source of funds would be needed to pay off the construction loan. Possibly the most direct option for a homebuilder would be a subsidiary company established for the purpose of holding and managing the rental properties. The homebuilder could “sell” the completed home to this subsidiary as they would to any other investor.

For investors, or homebuilders, operating a rental business there are standardized investment loans for real estate. These are commonly available at a 70 percent loan to value ratio (NAR, 2013). For investors, the remaining equity will be funded from their capital sources, subject to their individual cost of capital. For homebuilders choosing to hold a home for rent the long term financing is more complex. Historically, a typical net profit on the sale of a home is around 10 percent (Taylor, 2013; Caulfield, 2013). Marketing costs and sales commissions constitute another five to six percent of the sale of a new home (Taylor, 2013). If the homebuilder is keeping the home, the homebuilder could avoid paying marketing or sales costs and the profit percentage will be able to be rolled into equity on the long term investment. This, combined with the 15 percent equity invested in the construction, could allow for a 70 percent investment loan to pay off the construction loan and fully, or nearly fully, finance the long term project. However, the

15 percent equity invested at construction will remain tied up in the home for the life of the project. The homebuilder will need sufficient capital to fund successive build-to-rent homes. This may put a limit on the number of homes a small or medium firm would be able to finance internally. Some alternative financing options should also be considered.

Equity partnerships are private investors who provide funding for projects in exchange for a share of the profits. Partners may actively participate in the project, but more often they are silent partners, contributing only capital. A major risk for equity investors is that of liability. If not properly structured, an equity partner’s liability may extend to their personal finances, not limited to their investment in the project. In order to protect equity partners the agreement should define them as limited partners. A limited partner has no active role in managing the project, but is only liable to the extent of their investment. Partners may be individuals, groups, investment funds, or even local governments (Kone, 2006). Equity partnerships potentially offer an excellent vehicle for builders and investors, as the builder can provide the construction expertise while the investor provides the funding.

Joint ventures are similar to partnerships, but are structured as companies created to serve a specific purpose. Joint ventures can be organized as LLCs, corporations, or general partnerships. Since joint ventures are established as separate entities from the partner firms, the risk in joint ventures is limited to the financial commitment of the partners. Joint ventures are commonly employed to pool other resources in addition to financial capital. For example a large company with funds and bonding capacity may joint venture with a smaller firm with an expertise in a specific geographic area or project type. A major challenge for joint ventures is clearly delineating areas of responsibility

and distribution of profits or losses. An obstacle for joint ventures as a financing solution is that they do not leverage outside capital. Joint ventures rely on the financial resources of the partner firms. As previously discussed, without employing resources from outside, most small homebuilders would not have sufficient funds to support a significant number of projects. However, on an individual project basis, joint ventures have the potential to be a practical solution to fund projects (Kone, 2006).

An alternative that has limited, but successful, current application is combined construction and permanent mortgage loan programs. These loans are generally used in presale situations where there is a homebuyer seeking to build a new home. These loans are taken out by the homebuyer rather than the builder. Effectively, the homeowner then pays the builder to build their home, though the lender usually maintains control of releasing funds to ensure the home is completed satisfactorily. When the home is completed, the loan is automatically converted into a mortgage. The advantage to the homebuilder is that they are not responsible for the financing. For the purpose of build-to-rent, it is possible that lenders that already have construction to permanent loan programs would be willing to use them as a framework for a construction to permanent investment loan (NAHB, 2012).

2.1.1.3 Financing for Rental Housing

Real Estate Investment Trusts are perhaps the largest potential investment source for build-to-rent projects. REITs are designed to operate income producing properties and therefore have previously rarely been involved in owning residential projects. Homebuilding projects are a risky proposition for REITs because their shareholders

expect consistent and growing dividends. REITs are, by definition, relatively large investment institutions. They generally seek to hold equity stakes in large income producing properties. However, as previously referenced, several REITs have been established expressly to invest in single family rental housing (Whelan, 2013). If institutional single family rental housing proves to be successful, these REITs may become interested in partnering with homebuilders to participate in build-to-rent projects. A likely scenario would be for a REIT to partner with a homebuilder to build income producing rental property specifically to add to the REIT's portfolio (Kone, 2006; Sheppard 2012). For private investors, data from Wood and Yong (2004) indicates that the preference for investment types can be grouped by income levels. Higher income investors are interested in higher value properties for the tax-related benefits of property ownership. They are willing to accept a much lower ratio of rent to value. Lower income investors, who still tend to have incomes above the median, are primarily focused on cash flow. They are driven strongly towards low-cost properties with relatively high rental rates (Wood & Yong, 2004). For a build-to-rent model, this suggests that higher income and institutional investors are likely to be the key demographic, as prospective owners, for the new home rental product, as their focus is on stable long-term returns, tax benefits and sustaining value.

2.1.1.4 Lot Value Percentage

Other than size, the largest determinant of a home's value is the value of the land on which it is built. The ratio of the value of the land to the total value of the land and home is the lot value percentage. This ratio tends to increase as one moves closer to cities

and decrease as one moves towards rural areas. This is the key component in the difference in home values between urban, suburban and rural settings in a given market area. In areas of denser development, and higher demand, the value of the lot is higher. The cost to construct a home of a given size and quality varies little across the locations. If a homebuilder were to build identical homes for rental, one in a 30% market area and one in a 15% market area, the home in the 15% market area will cost significantly less. This ratio indicates to the developer the appropriate construction cost for a home on a given lot. For example, a $40,000 lot in a 30% market area should have a home worth $166,667, therefore the maximum cost of construction (including overhead and a profit margin) should not exceed $126,667. Historical data from the NAHB shows that the average lot cost percentage of sales price has stayed within a narrow range of 24 to 26 percent (NAHB Economics Group, 2012). While individual markets can have wide variation, the NAHB data provides a useful baseline value.

2.1.1.5 Construction Quality and Cost

The home design process for build-to-rent is similar to any other home. However, in the build-to-sell market the key consideration in design is marketability. The focus is to deliver an appropriately priced home with features that will attract buyers. For build-to-rent, the focus should be on cost-effectiveness, efficiency and durability. In fact, the ability to tailor the design and construction of the home for a long-term investment is a key advantage build-to-rent has over buying pre-owned homes for renting. Springer and Waller suggest that property age is the largest driver of maintenance costs per square foot for rental housing (Springer & Waller, 1996). Renting new homes offers significant

savings to the investor. Proper design can not only decrease the upfront cost of the home, but can offer significant returns over time if maintenance and operating costs are reduced. Ellison, Sayce, & Smith (2007) indicate that sustainable features of investment property add value through their effect on operating expenses.

A few cost effective design elements can be implemented with little to no detriment on marketability. For example, if possible, slab on grade foundation should be used, as this is both durable and cost effective. The design should use dimensions allowing full lumber boards wherever possible. This reduces waste and also labor time to cut boards. Likewise, maximum stud and joist spacing should be used to reduce material costs. Hard board siding is an excellent option for the exterior finish, as it is relatively low maintenance and reasonably affordable. The kitchen and bathrooms should be grouped together on the floor plan to minimize the amount of piping required. If possible, all rooms should be oriented along an axis to allow a single HVAC duct to service all the rooms (Ruiz, 2013).

While the initial instinct on an investment property might be to minimize costs by using the lowest cost option at every turn, this could well backfire if inferior products and materials require frequent repair or replacement. Some examples might include using low-cost standard grade ceramic tile for kitchen flooring. Vinyl flooring is less expensive initially, but is easily torn or damaged by heavy use. Over the life of the project, replacing vinyl repeatedly might add up to a greater overall cost. Likewise, plumbing and electrical fixtures should be selected for durability and practicality over purely aesthetic appeal.

2.1.2 Demand Parameters

A major determinant for the success or failure of a build-to-rent product type will be the market demand for rentals. The single family rental market in the United States is currently larger than the historical trend. Analysts attribute this to a weak employment market, a large number of foreclosures and the difficulty of securing credit (Altisource 2013; American Residential, 2013). Generally speaking, the preferential demand environment for build-to-rent will be one in which demand for rental properties is high and demand for homes for purchase is low. Skaburskis (1999) found that there is an inverse relationship between rental prices and demand for owner-occupied housing. Higher rental prices increase demand for home ownership and high home purchase prices increase the demand for rental housing as well as higher density housing. An analysis by Rose (2006) further suggests that there is a positive return on investment on home ownership versus renting even when the total annual rental cost is less than 50% of the cost of home ownership. Benetrix, Eichengreen & O'Rourke (2012) indicate that the main predictors of home ownership demand are interest rates and growth in gross domestic product. Their findings suggest that demand for rental housing can be expected to increase when interest rates rise and/or when GDP growth is slow. As of 2013, while interest rates are at historic lows, GDP growth has been historically slow for nearly five years. Further, while interest rates are low, greater scrutiny on lenders has resulted in a tighter credit environment for consumers (Shah, 2013). Demand for home ownership has remained low, while demand for rentals has increased (JCHS, 2013). Analysts predict that growth in demand for rentals will outpace overall housing growth over the next ten years (Jackson, 2013). A threat to the single family rental market would be a decline in

rental demand, however such a trend is expected to result from a rise in demand for home ownership, which would have an effect of raising values and increasing liquidity (Altisource, 2013).

A consideration of the viability of a new single family built-for-rent product is the potential income premium relative to older or distressed properties. For home sales, there has historically been a premium of approximately 15% on new construction over existing homes (Yun, 2013; Lubin, 2011). Since the model will use a direct capitalization method for modeling rental value, this premium will be considered as part of the total home value.

Another potential effect differentiating single family rental home from other income-producing property types is that the disposition strategy involves converting the asset to another classification, namely an owner-occupied home. Popular perception is that a tenant-occupied home depreciates in value relative to owner-occupied homes, however research has shown that there is no associated value loss due to previous use as a rental home, so this transition should not have an effect on final market value (Turnbull, G & Zahirovic-Herbert, 2012).

2.2 Residential Construction Financial Models

The foundation of the build-to-rent model will be the financial models for the separate construction and rental activities. The customary process for financially modeling a construction or development project is to prepare a pro forma analysis (Kone, 2006). Pro forma analysis is a blanket term that covers any pre-transaction calculation of projected outcomes (Ross & Wasterfield, 2008). The pro forma for single family residential construction uses the known cost of land acquisition, projected construction costs and projected overhead costs as the transaction costs. The transaction revenue is the projected market value of the product, captured at the eventual sale. The key source of uncertainty in the single family pro forma is the time-on-market of the constructed home. Maintenance costs and, more importantly, interest expenses accrue during any time the home remains unsold. For this reason the residential pro forma model includes a temporal element. The projected time on market, derived from the prevailing market conditions, is used to approximate the carrying costs of the unsold home. A construction pro forma will comprise one half ofthe combined model of a build-to-rent product.

2.2.1 Single Family Home Construction Model Description

The first constituent model is a model of a single family homebuilding project. Developing the own version of this model is a key step in the process of developing a complete build-to-rent model. The development of a base construction model will serve several purposes. Firstly, it will provide control return data for investment comparison for

single family homebuilders. Second, the model's efficacy can be tested by comparing the model's output data to available market data. The model's output should agree with the real-world data. Lastly, developing and testing the single family product model independently will increase the confidence in the subsequent models incorporating the construction phase model. The quantitative result of single family home construction model is the net profit. Once this model has been developed and tested individually, it will form the first part of the build-to-rent model.

In addition to the key variables, several input assumptions are necessary for the model. Each of these assumptions is a known value specific to the project. These values will vary across construction projects. However, the home builder can exercise a degree of control over these values through business plans and project selection. Since these values are relatively predictable or controllable, it is not necessary to conduct separate sensitivity analysis on each. These values can be changed by the user to fit the model to various projects. The input assumptions include price paid for the lot, the lot value percentage for the market area, the builder's target gross margin, financing terms, the initial equity required by the lender and the projected time of construction. The key market variables for a home sale are the time-on-market after completion and interest rate on the construction loan. Both of these values are determined by market conditions out of the home builder's control. Home builders, assuming they are using debt financing, must accept the interest rate set by the market. If high interest rates persist in the market, builders may increase their target gross margin to compensate. This was seen in the late 1970's, as discussed in Section 2.4. The time-on-market after construction is completed is a major variable and can be volatile. As the AD&C loan is fully drawn during this stage,

interest costs are high and significant time-on-market has a serious impact on the net profit.

Figure 2.2.1 shows the single family home construction model as it appears in Excel with example data for illustration. Appendix A shows the composite Excel formulas and cell references within the model. The values displayed in the boxes titled “Assumptions” and “Key Variables” are given input values set by the user. The model is separated into the construction phase and the marketing phase. The construction phase contains the financial activities that occur while the home is under construction. The marketing phase contains the cost of the home remaining unsold upon completion.

Assumptions	
Lot Value	$60,000.00
Target Gross Margin	76%
Construction Period (Months)	6
MKT Area Lot Value %	25%
LTV Investment Loans	80%
Initial Equity Percent Required	15%
Points Paid on Loans	2%
Key Variables	
Time-On-Market (Months)	2
ADC Loan Rate	8%
Construction Phase	
Base Projections	
Completed Value	$240,000.00
Loan Amount Available	$192,000.00
Initial Equity Required	$36,000.00
Direct Costs	
Lot Purchase Price	$60,000.00
Construction Cost	$122,400.00
Indirect Costs	
Points Paid	$3,840.00
Interest Paid	$3,799.30
Derived Values	
Additional Equity Required	$0.00
Financing Costs	$7,639.30
Loan Amount Drawn	$190,039.30
Marketing Phase	
Additional Interest	$2,533.86
Results	
Gross Profit	$57,600.00
Gross Profit Margin	24.00%
Net Profit	$11,426.85
Net Profit Margin	4.76%

Figure 2.2.1 - Single Family Home Construction Model
(Adapted from Shinn, 2008, Schmitz, 2004 and Griffin, 2010)

The “Base Projections” are calculated directly from the given assumptions and variables. The completed value is calculated from the lot value using the market area lot value percentage. The loan amount is calculated from the completed value given the assumed loan-to-value. The initial equity is calculated from the completed value and the required initial equity assumption.

$$Completed\ Value = \frac{Lot\ Value}{Market\ Area\ Lot\ Value\ \%}$$

$$Loan\ Amount\ Available = Completed\ Value\ \times LTV\ Investment\ Loans$$

$$Initial\ Equity\ Required = Completed\ Value\ \times Initial\ Equity\ \%$$

Figure 2.2.2 – Single Family Construction Model – Base Projection Equations
(Adapted from Shinn, 2008 and Griffin, 2010)

The “Direct Costs” are the hard costs related to construction. The lot purchase price is directly transposed from the given lot value. The construction cost is calculated using the completed value, lot price and target gross margin. The homebuilder’s required gross profit, given the target gross margin, minus the lot purchase price, gives the allowable construction budget to meet the gross profit requirements. The model assumes the construction cost is equal to the budget.

$$Lot\ Purchase\ Price = Lot\ Value$$

$$Construction\ Cost = (Completed\ Value\ X\ Target\ Gross\ Margin) - Lot\ Purchase$$

Figure 2.2.3 – Single Family Construction Model – Direct Cost Equations
(Adapted from Shinn, 2008 and Griffin, 2010)

The “Indirect Costs” include points paid at the lot closing and the interest expense. Points paid are determined directly from the loan amount and the given points paid on loans. The interest expense is the most complex calculation of the model. This is because the homebuilder is able to use loan funds to make interest payments. Therefore interest costs must be included in the calculation of total costs, which is used to determine whether the full available loan amount will be drawn upon. In order to avoid a circular reference the model first calculates the interest due on total costs excluding interest paid. This amount is added to the total cost and used to calculate the interest paid. The interest calculation makes use of Excel’s logical reasoning capability via an “If” function. The model determines if the total cost, including interest costs on total costs excluding interest, are less than the loan amount authorized. If the costs are less, then the model calculates interest on the amount of the loan needed to complete construction. If the costs are greater than, or equal to, the loan amount authorized, the model assumes a straight-line projection of loan draws. Thus, interest is calculated on the average amount drawn. The annual loan interest rate is prorated by the months of construction.

$$Total\ Costs = Direct\ Costs + Indirect\ Costs$$

$$Interest\ Paid = \left\{ \begin{array}{c} \left\{ \begin{array}{c} If\!: Total\ Cost < Loan\ Amount\ Available \\ \left(\frac{Total\ Costs}{2}\right) \times \left(\left(\frac{Construction\ Period}{12}\right) \times Loan\ Rate\right) \end{array} \right\} \\ Or \\ \left\{ \begin{array}{c} If\!: Total\ Cost < Loan\ Amount\ Available \\ \left(\frac{Loan\ Amount\ Available}{2}\right) \times \left(\left(\frac{Construction\ Period}{12}\right) \times Loan\ Rate\right) \end{array} \right\} \end{array} \right\}$$

$$Points\ Paid = Loan\ Amount\ Available\ \times Points\ Paid$$

Figure 2.2.4 – Single Family Construction Model – Direct Cost Equations
(Adapted from Shinn, 2008)

The “Derived Values” are calculated interim results within the model. The additional equity required is the determination if total costs exceed the loan amount available. If the total costs exceed the loan amount and initial investment, the homebuilder must invest additional equity to fund the project. The financing costs show the total costs of financing, points paid plus interest paid. The loan amount drawn is the amount of the loan drawn to complete the home if the entirety of the loan amount available is not used to complete the home. Otherwise this is equal to the total loan amount.

$$Additional\ Equity\ = \begin{cases} \left\{ \begin{array}{c} If: Total\ Cost > Loan\ Amount\ Available + Initial\ Equity \\ Total\ Cost - Loan\ Amount\ Available + Initial\ Equity \end{array} \right\} \\ Or \\ \left\{ \begin{array}{c} If: Total\ Cost > Loan\ Amount\ Available + Initial\ Equity \\ 0 \end{array} \right\} \end{cases}$$

$$Financing\ Costs = Interest\ Paid + Points\ Paid$$

$$Loan\ Amount\ Drawn = \begin{cases} \left\{ \begin{array}{c} If: Total\ Cost < Loan\ Amount\ Available + Initial\ Equity \\ Total\ Cost - Initial\ Equity \end{array} \right\} \\ Or \\ \left\{ \begin{array}{c} If: Total\ Cost > Loan\ Amount\ Available + Initial\ Equity \\ Loan\ Amount\ Available \end{array} \right\} \end{cases}$$

Figure 2.2.5 – Single Family Construction Model – Base Projection Equations
(Adapted from Shinn, 2008, Schmitz, 2004 and Griffin, 2010)

The marketing phase represents the financial impact of the completed home remaining unsold for a period of time after construction is complete. The “Additional Interest” equation assumes that the loan is fully drawn, either through construction or to fund interest payments. The interest on this amount is calculated for the months on market after completion of the home, if any. The model does not account for costs related to time-on-market other than interest. Costs such as maintenance and utilities are highly project dependent and strongly influenced by weather, geography and economic factors. Users of the model should be cognizant of the potential impact of these factors.

2.3 Residential Income-Producing Property Financial Models

The standard valuation model for income producing rental properties is the discounted cash flow analysis, or DCF (Miles, Berens, Eppli & Weiss, 2007; Epley et al, 2002). Discounted cash flow analysis uses financial analysis to value the future cash flows from a piece of property to express the potential financial value to the investor. In Net Present Value analysis future projected cash flows on the property are discounted to the present based on an expected rate of return. The expected rate, also known as discount rate, is an interest rate used to convert anticipated future cash flows into present value (Sonneman, 2009). The expected rate of return is the return that an investor should expect from a given investment type. Discount rates are set in the open market where various investment alternatives compete for investment capital. The expected rate, or discount rate, is determined by three components, the real interest rate, a risk premium and an inflation premium.

The primary component is a real rate of return. This is the base return that investors are receiving, across all investments, for investing rather than saving (Miles et. al, 2007). This rate is set based on the market demand for investment capital. The higher the demand for investment capital, the higher the return rates offered to investors to attract capital (Miles et. al, 2007).

The second component of the discount rate is an inflation premium(Miles et. al, 2007). This is an added rate to account for the loss of real dollar value due to inflation over time. All investments contain these first two factors (Miles et. al, 2007). In a given market it is assumed that these components are equal across investment alternatives, as

all investments in the market face the same base investment demand and inflation effects. A rate combining these two factors is a risk-free rate. This is the rate of return an investor could receive from a secure non-risky investment. The exemplar of a risk-free rate is the 10-year US Treasury bond rate (Miles et. al, 2007).

The third component is a risk premium (Miles et. al, 2007). This is the additional return potential that an investor will expect from the investment to be compensated for undertaking the risk of the particular investment. As real estate investments are traditionally considered especially risky, the risk premium comprises a significant portion of the discount rate on an investment property (Miles et. al, 2007).

A related method for valuing real estate investments is the direct capitalization valuation model. This method uses a multiplier, known as a capitalization rate, to derive a value from current period net income from the asset (Miles et. al, 2007). This method is also called the present value relationship. This is because it expresses asset value as the present value of all future rents. By extension, the rent rate is the amount at which a payment in perpetuity has a present value equal to the market value of the asset (Edelstein & Tsang, 2007; Epley, Rabianski, & Haney, 2002). A capitalization rate is equivalent to net operating income divided by the property value. Commonly, a market derived capitalization rate is used quickly to derive an expected market value from a property's income. The direct capitalization rate method is used more frequently than discounted cash flows as it is swift and allows easy comparison across property types. However, it is considered a less accurate assessment of financial value. Section 2.6 comprises an in-depth analysis of single family capitalization rates.

2.3.1 Property Pro-Forma

The basis for the discounted cash flow model is the property pro forma (Miles et. al, 2007; Epley et al, 2002). This is a model of the anticipated net income from the operation of the property in a given time period. The standard statement of net operating income is:

EGI = PGI - V

NOI = EGI - OE

Where: PGI = Potential Gross Income
V = Vacancy
EGI = Effective Gross Income
OE = Operating Expenses
NOI = Net Operating Income

Figure 2.3.1 – Property Pro Forma Calculation
(Adapted from Miles et. al, 2007; Epley et al, 2002)

In the pro forma, the potential gross income is the total possible revenue for leasing the property at market rental rates for the entire period. Vacancy is any loss of revenue due to time during the period the property is not generating revenue through rent. Vacancy is generally expressed as a percentage of the time in the period. Potential gross income less vacancy is a value referred to as effective gross income. This value is important to real estate analysts as it is considered the owner-independent income. The factors comprising effective gross income are determined by market forces. Operating expenses are the total recurring costs related to operating the building, including maintenance, repairs, and

amenities. This does not include one-time capital expenditures, tenant-specific costs or major repairs that do not occur during the regular operation of the asset. Liu (2005) and Emrath (2012) analyzed single family home operating expenses from the US Census' American Housing Survey. They found that non-utility operating expenses for new homes comprised an average of 1.49% of the value of the home. Effective gross income less operating expense is the net operating income. For investment analysis purposes, all of the values used in computing the net operating income are projections based on market values. Thus, net operating income is considered owner independent. That is, the appropriate net operating income for analyzing a property does not assume any beneficial or detrimental effects from a particular property owner. Factors relevant to individual owners, such as tax considerations, cost of third party management, or variances due to differences in competency are not considered (Miles et. al, 2007; Epley et al, 2002).

Income property analysis techniques are most often used on commercial income-producing property with multiple income streams. The major variation in applying this analysis to a single family product is adapting the analysis to reflect a single income stream. In an office building or apartment with numerous units a vacancy in one unit reduces the income stream, but does not eliminate it. A single family home, however, offers a single income stream. A vacant home offers no income stream. Therefore, determining an appropriate time on market will be especially important for single family rental analysis. Allen (2009) investigated the effect of pricing strategy on the time on market (vacancy rate) for single family properties. They found that lower asking rents correlates to less time on market and less vacancy. Whereas higher rents correlate to a longer time vacant on market. Both scenarios threaten total revenue. A lower rent may

lower vacancy, but also decreases PGI. A higher rent raises PGI, but increases vacancy. These findings highlight the importance of asking a market appropriate rental rate.

2.3.2 Single Family Rental Home Investment Model Description

The model for a rental investment home is a standard discounted cash flow analysis. This model displays a scenario involving an investment mortgage for the property. The model relies on the principle that value can be calculated as a function of rental income. In addition to the key inputs variables, several input assumptions are necessary for the model. Each of these assumptions is a project specific value. These values will vary across investment properties. However, investors can exercise some control over these values through business plans and project selection. These values can be changed by the user to fit the model to various investments. However, since these values are relatively predictable or manipulable, it is not necessary to conduct separate sensitivity analysis on each. The input assumptions include, the price paid for the property, the vacancy rate, the LTV on debt financing, loan terms, and the expenses related to selling the property at the end of the period. The key variables for the investment model are the discount rate (cost of capital), capitalization rate and inflation rate. Figure 2.3.2 shows the single family rental home investment model with example data for illustration. The formulas comprising the model are shown in Appendix B. The values displayed in the boxes titled “Key Variables” and “Assumptions” are given input values set by the user. “Loan Terms” are set by the user, except for the payment amount which is calculated from the inputs using Excel’s PMT function.

Key Variables	
Discount Rate	5.00%
Cap Rate	8.00%
Inflation Rate	2.00%

Assumptions		Loan Terms	
Home Value	240000	Loan Amou	$192,000.00
Vacancy	1/24	Rate	5%
Selling Expenses %	5.00%	Term	30
LTV Investment Loa	80.00%	PMT Annua	($12,489.88)

Derived Variables	
Acquisition Equity	$48,000.00
Market Rent	$ 19,200.00

Reversion	
Year 10 Sales Price	$286,822.22
Loan Balance	$155,651.46
Selling Expenses	$14,341.11
BTER	$116,829.65

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
NOI	$ 19,200.00	$19,584	$19,976	$20,375	$20,783	$21,198	$21,622	$22,055	$22,496	$22,946
DS	($12,490)	($12,490)	($12,490)	($12,490)	($12,490)	($12,490)	($12,490)	($12,490)	($12,490)	($12,490)
BTCF	$ 6,710.12	$7,094	$7,486	$7,885	$8,293	$8,708	$9,132	$9,565	$10,006	$10,456
DCF	Cash Flow 0	Cash Flow 1	Cash Flow 2	Cash Flow 3	Cash Flow 4	Cash Flow 5	Cash Flow 6	Cash Flow 7	Cash Flow 8	Cash Flow 9
	-$48,000.00	$6,710	$7,094	$7,486	$7,885	$8,293	$8,708	$9,132	$9,565	$126,836
IRR	22.4456%									

Figure 2.3.2 - Single Family Rental Model
(Adapted From Miles et. Al, 2007 and Fisher & Martin, 2004)

The “Derived Variables” are prerequisite values for the model calculated from the base inputs. “Acquisition Equity” is calculated as the difference between the purchase price, assumed to be the home value, and the loan amount. The “Market Rent” is calculated as a function of the home value using the capitalization rate.

$$Purchase\ Price = Home\ Value$$

$$Acquisition\ Equity = Purchase\ Price - \ Loan\ Value$$

$$Market\ Rent = Home\ Value \ \times \ Capitalization\ Rate$$

Figure 2.3.3 – Single Family Rental Model – Derived Variables
(Adapted From Miles et. Al, 2007 and Fisher & Martin, 2004)

The “Reversion” is the projected conditions of the sale of the property at the end of the investment term. The sales price is calculated from the final year’s rent using the capitalization rate. The loan balance is calculated using Excel’s finance functions given the loan terms and investment term. Selling expenses are the percentage set by the user of the Year 10 sales price. The “Before Tax Equity Reversion”, BTER, are the net proceeds to the investor from the sale of the investment in the final year, disregarding any unknown tax conditions.

$$Sales\ Price = \frac{PGI\ (Year\ 10)}{Capitalization\ Rate}$$

$$Selling\ Expenses = Selling\ Expense\ \% \times Sales\ Price$$

Figure 2.3.4 – Single Family Rental Model – Reversion
(Adapted From Miles et. Al, 2007 and Fisher & Martin, 2004)

The annual before tax cash flow, BTCF, is the net operating income less debt service.

$$Before\ Tax\ Cash\ Flow = Net\ Operating\ Income - Debt\ Service$$

Figure 2.3.5 – Single Family Rental Model – BTCF
(Adapted From Miles et. Al, 2007 and Fisher & Martin, 2004)

The final Discounted Cash Flow, DCF, shows the annual net cash flow per year. Year "Zero" is the initial cash investment to acquire the property or "Acquisition Equity", shown as a negative cash flow. The succeeding year's cash flow are the annual "BTCF", excepting the final year which is the "BTCF" plus the "Equity Reversion". The "Internal Rate of Return" is calculated from the annual before tax cash flows using Excel's IRR function.

2.4 Build-to-Rent Key Variables

This section covers the process for determining the key input variables to use in testing the model. The anticipated key variables for the model are based on analysis of the separate construction and investment models. The key variables determined from the literature review are the capitalization rate, income growth rate and the discount rate, comprised of a risk free rate and a risk premium. The numerical research related determining the ranges of the values to be used in the sensitivity analysis of the model is discussed in section 3.3.

2.4.1 Capitalization Rate for Single Family Detached Homes

The most important input variables for financial modeling of a build-to-rent project are the input values for cash outlays and returns. The capitalization rate is a present value relation which expresses rent returns as a function of market value, which is the expected acquisition cost. Dokko, Edelstein, Lacayo, & Lee found that the relationship of value to capitalized rents does hold true, with rents expressed as the capitalized value of all future returns (Dokko et al, 1999). Meese and Wallace, Ayuso and Restoy, and Bojilov, all examined this relationship specifically in reference to single family rental markets and found that while the relationship can be an inaccurate predictor over short time scales, it is predictive over multi-year investment horizons (Meese & Wallace, 1994; Ayuso & Restoy, 2007; Bojlov, 2005). They attribute the short run

inaccuracy to the relatively low liquidity of single family homes, resulting in a latency in the response to market shifts. This effect may be mitigated with single family homes as an asset class for large capital investors as their resources and competencies will allow them to monitor and react to market changes. Edelstein and Tsang attempted to define these short run fluctuations in terms of supply and demand externalities. Their findings support Meese and Wallace's view that values tend to regress to the capitalized value of the rents (Edelstein & Tsang, 2007). Hui and Zheng suggest that the long-term applicability of direct capitalization is greater for housing markets than for other real estate asset classes (Hui & Zheng, 2011). This is especially interesting as the direct capitalization model is widely accepted by commercial appraisers for office, industrial and retail applications (Fisher & Martin, 2004). Hui and Zheng also established that the short run rejection of the rent to value relationship is primarily due to fluctuations in property values and that rental rates are much more stable (Hui & Zheng, 2011). For this reason, rental rates are the preferred independent variable input for the calculation. For general housing analysis, the rent component of the consumer price index is considered the standard rental value (Ayuso & Restoy, 2007).

In the investigation of a build-to rent product, a key question is the applicability of the established methods of valuing real estate assets to a hypothetical unbuilt home on a given lot. The International Accounting Standards Board has issued guidance on valuing assets under construction from a financial underwriting perspective. They advise that general appraisal methods are appropriate to apply to future assets (Ciartino, 2012). Considering the validity of using land or lot value as a basis for ultimately forecasting a rental rate, analysis by Barton shows that land value has a direct impact on rental rates,

with land value comprising a component of rent price in the same way it comprises a component of home price (Barton, 2011).

There are a number of acceptable methods for determining an appropriate capitalization rate. Using market comparable data is the most accurate for a given market area, this is accomplished by using known market values (sales prices) and income values for comparable properties in the market area (Deweese, 2009) . When data for comparable properties in the market area is not available several other methods are available. A baseline return rate, such as the prime rate or treasury rate, can be added to a risk premium appropriate for the market and property type to estimate a capitalization rate. Another method employed by underwriters and appraisers is to multiply the debt coverage ratio by the loan-to-value ratio and a standard mortgage capitalization rate, this is known as the underwriter's method (Deweese, 2009). A similar method is the band-of-investments technique in which capitalization rates are calculated as (Devaney, 2005):

$$R_O = M \times R_M + (1-M) \times R_E$$

Where: M = the loan-to-value ratio
RM = the mortgage capitalization rate
RE = the equity capitalization rate (equity dividend rate)

Figure 2.4.1 – Band-of-Investments Technique (Devaney, 2005)

Another financial concept is that the market discount rate, investment return, is generally equivalent to the capitalization rate plus the income growth rate. Therefore, if discount rates and income growth are known, these can be used to establish a capitalization rate (Sonneman, 2009). Finally, a qualitative method of deriving cap rates is to conduct a

survey of real estate professionals. Since capitalization rates are defined by market values as compared to income streams, the prevailing income-to-value acceptable to the industry is an excellent indicator of capitalization rate. Unfortunately, subjective surveys are vulnerable to issues of bias and sentiment, and surveys take time to conduct. Because of this, results from this method may not accurately reflect current market conditions.

In reaction to the real estate market downturn, and accompanying lack of market transactions, Deweese (2009) recommended a novel method of calculating capitalization rates using financial data from REITs investing in that asset class. The theoretical basis for this method is; that REITs are merely securitized investment vehicles for real estate asset types, and therefore, their overall financial data should reflect the fundamentals of the underlying assets. Therefore, the interest in investments in REITs should reveal an implied capitalization rate calculable from the REIT's financial data.

2.4.2 Discount Rate for Single Family Detached Homes

As discussed in Section 2.2, the returns of a real estate investment are measured using a discount rate. This is the return rate that investors require from the investment class. The discount rate is composed of three components: the real return rate, the inflation premium, and a risk premium. As all investments in a given market are subject to the same market effects that determine the real return rates and inflation premiums, the baseline investment return in that market is the return on an investment without risk.

2.4.2.1 Risk Free Rate for Single Family Detached Home Investment

United States Treasury bonds are generally regarded to be essentially risk-free as they are backed by the full faith and credit of the United States Federal Government. For appropriate comparison of return rates, investment alternatives with similar terms should be analyzed. Real estate is considered a long term asset. Miles et. al. suggest the ten-year Treasury Bond rate is the standard risk-free rate for real estate investors (Miles et. al, 2007).

2.4.2.2 Risk Premium for Single Family Detached Home Investment

In addition to the risk-free rate, comprising the real rate of return and inflation premium, the other component of investors' discount rate is an inflation premium for the asset class. The risk premium is the additional return that investors expect from the asset class in return for assuming the level of risk inherent in the investment. The riskier the asset, the higher the potential return must to be to attract investment capital. The risk premium for an investment class is a subjective measure of the market's perceived risk in the asset. Since risk premiums are a subjective value, they cannot be directly calculated. A value can be found through investor surveys, but the efficacy of the resulting values is questionable (Shilling, 2003). Van Wouwe, Berkhout & Tansens (2008) go so far as to say that selecting a risk premium for property's analysis is "entirely subjective". Investment returns can also be examined to determine the actual premium paid in an asset class versus comparable investments over the same time period. In theory the historical return premium should inform investors' expectations for future returns. . However, Shilling (2003) found a wide gap between actual and expected returns on real estate

investments.

Fisher and Martin (2004) suggest that the most comparable market return rate to real estate investments are “Baa” junk bonds. They further argue that comparison of return rates with investment alternatives is a preferable method of determining discount rates for income property evaluation than the additive method used above. They argue that building a discount rate from its theoretical components increases uncertainty about the end result (Fisher & Martin, 2004).

2.4.3 Income Growth Rate for Single Family Detached Homes

The final key variable for a discounted cash flow model of a single family build-to-rent property is the rate of income growth. Effectively, this growth is the result of inflation on rental rates. This input affects both major yield parameters, annual cash flow and equity reversion. Since the direct capitalization method expresses property value as a function of rental income, the projected future value of the property is a function of the future rental income. This future market value is the end-of-investment equity return used for analysis.

The Federal Housing Finance Administration reports a 3.3% annual compound growth rate for home values (FHFA, 2013) For comparative values, Shilling (2003) found a growth rate for apartment homes of 3.23% whereas Ruff (2007) suggests that real estate income growth closely tracks inflation over the long term. Inflation in the United States, since 1980, as calculated from the Consumer Price Index has averaged 3.6% (BLS, 2013a).

2.5 Control Value – Investment Alternatives

An analysis of a build-to-rent product as an alternative market strategy for home builders must include a reference value for the status quo, build-to-sell product. Since the models of a build-to-rent product will provide a property-level return, it is necessary to determine a typical property level return from a comparable build-to-sell product. The NAHB Economic Group's Cost of Doing Business Studies provide historical benchmark data on homebuilder outcomes (NAHB Economics Group, 2012). The Cost of Doing Business is a series of industry studies conducted regularly since 1969. According to the NAHB, in a healthy market, the typical home construction project should have a gross profit of 22-27% (NAHB Economics Group, 2012). The NAHB defines gross profit as the sales price minus the cost of sales, composed of the land cost, direct materials and labor, and onsite indirect costs, such as supervision. The historical data from 1969 to 2006 shows that the gross profit on home sales averaged 23.6%, with a high of 31% and a low of 16.7% (NAHB Economics Group, 2012). A major source of volatility in gross profits from home sales relates to the cost of financing. Concurrent with the record 31% gross profit recorded in 1982, was a record 15% of total costs of construction allocated towards the cost of financing construction. In effect, home buyers were getting "less house" for the purchase price, due to the proportion of the funds that were required to service the cost of financing. In times of high costs of financing home builders are forced to compensate by raising prices. Excepting the high interest rate environment of the early 1980s, the average of the NAHBs data points on cost of financing since 1969 was 2.9%. Sales commissions consume an additional 3.5% of the profit on a typical home sale.

Marketing costs average about 2% of home sale price (NAHB Economics Group, 2012). Using these values, a composite typical single home construction financial outline can be deduced. Costs directly accountable to the construction, marketing and sale of a typical home total approximately 85% of the revenue from a sale. The net income for the firm is this figure less overhead, administrative and indirect business costs. These costs are difficult to standardize as they are subject to highly individualized firm-level factors, such as overhead, management policy, ownership structure and tax factors. The NAHB states that a *target* net profit for homebuilders should be 8% or higher. However, historically the NAHB's studies show a degree of volatility in homebuilder net income. Since 1970 net income averages 5.2% with a high of 10.0% in and a low of -3.0% in 2008 (NAHB Economics Group, 2012). According to the US Census (2013b) the average home construction timeline since 2000 for homes built-for-sale is 5.9 months. So, a homebuilder should be able to turn over their capital twice per year. From these figures, an equity investment in traditional homebuilding business should yield an annualized return of around 10% over the long term. There is volatility year-to-year, but the NAHB data indicates that the home building business cycle typically revolves multiple times per decade. This gives a degree of confidence that annualized returns would regress to the mean over the 10-year investment horizon chosen for the build-to-rent model.

CHAPTER 3: METHODOLOGY

3.1 Model Design

This chapter contains descriptions of the structure of the developed model of build-to-rent products. The unique factor inherent in a build-to-rent product is that it combines two previously separate constituent activities, construction and investment, which are not normally combined in this asset class. The constituent activities of the build-to-rent process each are well established and have accepted methods of analysis. Homebuilding construction pro forma benchmarks are available and income property analysis methods are well established in the real estate industry. The challenge of modeling a build-to-rent business line is to link the intersections of these two activities to produce a comprehensive flow-through of the initial conditions and parameters, from the purchase of a vacant lot through the rental ownership period. The review of the literature indicated four key input values that most strongly predict the outcome of the model, a baseline interest rate (the US Treasury Rate), a risk premium for residential rental property, a growth (inflation) rate, and the capitalization rate for single family homes. Since the baseline interest rate and risk premium are only used in conjunction for sensitivity analysis they can be combined into a single input displaying the possible range, from the sum of the minimum of each rate to the sum of the maximum of each rate.

A project pro forma for the construction phase of the project will differ little from that used in a typical homebuilding project. Accounting for the additional financing challenges inherent in a build-to-rent project will be the major difference. Other changes

will include cost variances due to construction methods or quality. The model must account for the relevant factors that predict the outcome of the project. These types of analyses are commonly performed using spreadsheet software. Income property projections are similarly performed using a discounted cash flow analysis. This analysis accounts for major costs categories and revenues over time to arrive at a present value for the investment. The primary output of investment property financial models is the internal rate of return, the IRR is the annualized effective compounded return rate on the investor's capital from the investment. Projecting the annualized return rate allows simple comparison between various investment alternatives.

The literature revealed that funding and financing mechanisms specifically for build-to-rent products are not currently available. The primary model was developed using current funding and financing mechanisms available in the marketplace. This requires that the construction and investment portions of the project be financed separately. This introduces additional equity requirements and closing costs for each stage. These additional costs reduce the financial viability of the project. For comparison, a second model was developed modeling a hypothetical funding and financing mechanism optimized for the build-to-rent market. This mechanism is a commercial construction to permanent loan which requires only a single underwriting and closing process. This reduces the equity and closing costs required, and increases the likelihood of financial success.

Each of the models was built using Microsoft's Excel spreadsheet program. Microsoft's Office suite is the standard productivity suite available to users in the United States. There are a variety of alternative programs, including some open source solutions,

which are compatible with the Office Suite. Nearly all home building firms, including small firms, have access to Excel or a similar spreadsheet platform. Designing and operating the models within these programs allows for the greatest application of the results in the industry. While there are other modeling programs, none of the proprietary alternatives approach the widespread availability of the Microsoft suite. The available open source solutions lack the sensitivity analysis tools required for this purpose, but could be used for more basic modeling.

3.2 Model Descriptions

This section presents two financial model designs of a build-to-rent product. The first is a basic model representing the current business environment. Most prominently it models the requirement to finance the project using separate commercial loans for each phase, construction and permanent. The results of this model will show that the additional equity required to underwrite two separate loans challenges the financial viability of the project. The second model presents a scenario in which a hypothetical composite loan is available to finance the entire project, in essence a commercial construction to permanent loan. This allows a single equity outlay to be the foundation of the project. Such a loan is not currently common, but may be a necessary to the success of a build-to-rent industry.

3.2.1 Investor-Level Build-to-Rent Model Description – Commercial Loan (Current)

The investor level build-to-rent model is the basic build-to-rent financial model in the current business environment. The commercial loan model assumes the project will be financed through commercial lending. Further, this model assumes that the separate loans will be able to be acquired for each phase. It represents a situation where the permanent lender requires a minimum equity investment at the closing of the permanent loan. This is a common requirement, including for personal mortgages, where the lender wants the borrower to have actual cash in the purchase regardless of the theoretical equity of the home's excess value over the loan amount. For example an FHA mortgage requires a minimum down payment of 3.5% of the loan even if the appraised value is significantly

higher than the purchase price (FHA,2013). Figure 3.2.1 shows the construction portion of the investor-level build-to-rent model as it appears in Excel.

Key Variables	
Discount Rate	6.00%
Cap Rate	8.00%
Inflation Rate	2.00%
Construction Phase	
Assumptions	
Lot Value	$60,000.00
Target Gross Margin	76%
Construction Period (Months)	6
MKT Area Lot Value %	25%
LTV Investment Loans	80%
Initial Equity Percent Required	15%
Equity Percent Required on Permanent Mortgage	10%
Points Paid on Loans	2%
Base Projections	
Completed Value	$240,000.00
Loan Amount Available	$192,000.00
Initial Equity Required	$36,000.00
Direct Costs	
Lot Purchase Price	$60,000.00
Construction Cost	$122,400.00
Indirect Costs	
Points Paid	$3,840.00
Interest Paid	$2,835.50
Derived Values	
Additional Equity Required	$0.00
Financing Costs	$6,675.50
Loan Amount Drawn	$189,075.50

Figure 3.2.1 - Construction Phase Build-to-Rent
(Adapted from Schmitz, 2004, Shinn, 2008 and Griffin, 2010)

The “Base Projections” are calculated directly from the given assumptions and variables. The completed value is calculated from the lot value using the market area lot value percentage. The loan amount is calculated from the completed value given the assumed loan-to-value. The initial equity is calculated from the completed value and the required initial equity assumption.

$$Completed\ Value = \frac{Lot\ Value}{Market\ Area\ Lot\ Value\ \%}$$

$$Loan\ Amount\ Available = Completed\ Value\ \times LTV\ Investment\ Loans$$

$$Initial\ Equity\ Required = Completed\ Value\ \times Initial\ Equity\ \%$$

Figure 3.2.2 – Build-to-Rent Model – Construction Phase – Base Projection Equations (Adapted from Shinn, 2008 and Griffin, 2010)

The “Direct Costs” are the hard costs related to construction. The lot purchase price is directly transposed from the given lot value. The construction cost is calculated using the completed value, lot price and target gross margin. The homebuilder’s required gross profit, given the target gross margin, minus the lot purchase price, gives the allowable construction budget to meet the gross profit requirements. The model assumes the construction cost is equal to the budget.

$$Lot\ Purchase\ Price = \ Lot\ Value$$

$$Construction\ Cost = (Completed\ Value\ X\ Target\ Gross\ Margin) - \ Lot\ Purchase$$

Figure 3.2.3 – Build-to-Rent Model - Direct Cost Equations
(Adapted from Shinn, 2008 and Griffin, 2010)

The model includes the costs of financing the project construction with a commercial AD&C loan. The “Indirect Costs” include points paid at the lot closing and the interest expense, Points paid are determined directly from the loan amount and the given points paid on loans. The interest expense is the most complex calculation of the model. This is because the homebuilder is able to use loan funds to make interest payments. Therefore interest costs must be included in the calculation of total costs, which is used to determine whether the full available loan amount will be drawn upon. In order to avoid a circular reference the model first calculates the interest due on total costs excluding interest paid. This amount is added to the total cost and used to calculate the interest paid. The interest calculation makes use of Excel’s logical reasoning capability via an “If” function. The model determines if the total cost, including interest costs on total costs excluding interest, are less than the loan amount authorized. If the costs are less, then the model calculates interest on the amount of the loan needed to complete construction. If the costs are greater than or equal to the loan amount authorized, the model uses a straight-line projection of loan draws. Thus, interest is calculated on the average amount drawn. The annual loan interest rate is prorated by the months of construction.

$$Total\ Costs = Direct\ Costs + Indirect\ Costs$$

$$Interest\ Paid = \left\{ \begin{array}{c} \left\{ \begin{array}{c} If: Total\ Cost < Loan\ Amount\ Available \\ \left(\frac{Total\ Costs}{2}\right) \times \left(\left(\frac{Construction\ Period}{12}\right) \times Loan\ Rate\right) \end{array} \right\} \\ Or \\ \left\{ \begin{array}{c} If: Total\ Cost > Loan\ Amount\ Available \\ \left(\frac{Loan\ Amount\ Available}{2}\right) \times \left(\left(\frac{Construction\ Period}{12}\right) \times Loan\ Rate\right) \end{array} \right\} \end{array} \right\}$$

$$Points\ Paid = Loan\ Amount\ Available\ \times Points\ Paid$$

Figure 3.2.4 – Build-to-Rent Model – Commercial Loan - Indirect Cost Equations (Adapted from Shinn, 2008)

The “Derived Values” are calculated interim results within the model. The additional equity required is the determination if total costs exceed the loan amount available. If the total costs exceed the loan amount and initial investment, the homebuilder must invest additional equity to fund the project. The financing costs show the total costs of financing, points paid plus interest paid. The loan amount drawn is the amount of the loan drawn to complete the home if the entirety of the loan amount available is not used to complete the home. Otherwise this is equal to the total loan amount.

$$Additional\ Equity\ = \begin{cases} \begin{Bmatrix} If: Total\ Cost > Loan\ Amount\ Available + Initial\ Equity \\ Total\ Cost - Loan\ Amount\ Available + Initial\ Equity \end{Bmatrix} \\ Or \\ \begin{Bmatrix} If: Total\ Cost < Loan\ Amount\ Available + Initial\ Equity \\ 0 \end{Bmatrix} \end{cases}$$

$$Financing\ Costs = Interest\ Paid + Points\ Paid$$

$$Loan\ Amount\ Drawn = \begin{cases} \begin{Bmatrix} If: Total\ Cost < Loan\ Amount\ Available + Initial\ Equity \\ Total\ Cost - Initial\ Equity \end{Bmatrix} \\ Or \\ \begin{Bmatrix} If: Total\ Cost > Loan\ Amount\ Available + Initial\ Equity \\ Loan\ Amount\ Available \end{Bmatrix} \end{cases}$$

Figure 3.2.5 – Build-to-Rent Model – Commercial Loan – Derived Value Equations
(Adapted from Shinn, 2008, Schmitz, 2004 and Griffin, 2010)

The build-to-rent model does not include a marketing phase as it is assumed the property will be financed for long-term ownership and offered for rent immediately upon completion. Figure 3.2.6 shows the permanent phase of the basic build-to-rent model as it appears in Excel.

Rental Phase

Assumptions	
Vacancy	1/24
Selling Expenses %	5.00%
Permanent Equity % Required	10.00%

Loan Terms	
Loan Amou	$192,000.00
Rate	6%
Term	30
PMT Annu	($13,948.59)

Reversion	
Year 10 Sales Price	$356,662.83
Loan Balance	$159,989.24
Selling Expenses	$17,833.14
BTER	$178,840.45

Derived Variables	
Investment Equity	$58,124.50
Market Rent	$19,200.00

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
NOI	$19,200.00	$20,064	$20,967	$21,910	$22,896	$23,927	$25,003	$26,129	$27,304	$28,533
DS	($13,949)	($13,949)	($13,949)	($13,949)	($13,949)	($13,949)	($13,949)	($13,949)	($13,949)	($13,949)
BTCF	$ 5,251.41	$ 6,115.41	$ 7,018.29	$ 7,961.80	$ 8,947.77	$ 9,978.10	$11,054.80	$12,179.96	$13,355.74	$ 14,584.44
DCF	Cash Flow 0	Cash Flow 1	Cash Flow 2	Cash Flow 3	Cash Flow 4	Cash Flow 5	Cash Flow 6	Cash Flow 7	Cash Flow 8	Cash Flow 9
	-$58,124.50	$5,251	$6,115	$7,018	$7,962	$8,948	$9,978	$11,055	$12,180	$192,196
IRR	22.4371%									

Figure 3.2.6 – Build-to-Rent Model – Commercial Loan – Permanent Phase
(Adapted From Miles et. Al, 2007 and Fisher & Martin, 2004)

The “Derived Variables” are prerequisite values for the model calculated from the base inputs. “Acquisition Equity” is calculated as the difference between the purchase price, assumed to be the home value, and the loan amount. The “Market Rent” is calculated as a function of the home value using the capitalization rate.

$$Purchase\ Price = Completed\ Value\ of\ Construction$$

$$Market\ Rent = Home\ Value\ \times\ Capitalization\ Rate$$

$$\begin{aligned} &Investment\ Equity \\ &\qquad = Initial\ Equity + (Loan\ Amount - Construction\ Loan\ Amount\ Drawn) \\ &\qquad + (Loan\ Amount\ \times Permanent\ \ Equity\ \%\ Required) \end{aligned}$$

Figure 3.2.7 – Build-to-Rent Model – Permanent Phase – Derived Variables
(Adapted from Miles et. al, 2007 and Fisher & Martin, 2004)

The “Reversion” is the projected conditions of the sale of the property at the end of the investment term. The sales price is calculated from the final year’s rent using the capitalization rate. The loan balance is calculated using Excel’s finance functions given the loan terms and investment term. Selling expenses is a user defined assumption. The user should input an appropriate percentage of the selling costs paid by sellers in their market. The calculated net selling expenses are this percentage of the Year 10 sales price.

$$Sales\ Price = \frac{PGI\ (Year\ 10)}{Capitalization\ Rate}$$

$$Selling\ Expenses = Selling\ Expense\ \% \times Sales\ Price$$

Figure 3.2.8 – Single Family Rental Model – Reversion
(Adapted from Miles et. Al, 2007 and Fisher & Martin, 2004)

The annual before tax cash flow, BTCF, is the net operating income less debt service.

$$Before\ Tax\ Cash\ Flow = Net\ Operating\ Income - Debt\ Service$$

Figure 3.2.9 – Single Family Build-to-Rent Model – BTCF
(Adapted from Miles et. Al, 2007 and Fisher & Martin, 2004)

The final Discounted Cash Flow, DCF, shows the annual net cash flow per year. Year “Zero” is the initial cash investment to acquire the property or “Acquisition Equity”, shown as a negative cash flow. The succeeding year’s cash flow are the annual “BTCF”, excepting the final year which is the “BTCF” plus the “Equity Reversion”. The “Internal Rate of Return” are calculated from these cash flows using Excel’s IRR function.

3.2.2 Investor-Level Build-to-Rent Model Description – Improved Commercial Loan

The investor level build-to-rent model with an improved financing mechanism is fundamentally the same as the basic model. The key difference is that the model assumes a single lending product will be able to be acquired to fund the entire product. Such a product will only require a single outlay of equity, at the start of construction. Since a new loan closing will not be needed at the permanent phase, the equity will be used to partially fund construction and will not be recovered with construction loan proceeds. The lender will require the investor to keep an equity position in the project. However, this will ultimately reduce the amount of financing needed for the project. The other assumptions, calculations, and financial characteristics remain largely the same. The commercial loan model assumes the project will be financed through commercial lending. Further, this model assumes that the separate loans will be able to be acquired for each phase. The initial equity required for the construction phase, combined with the value created by the construction, is assumed to be sufficient equity to secure the permanent loan. Figure 3.2.10 shows the construction portion of the basic build-to-rent model as it appears in Excel.

Assumptions	
Lot Value	$60,000.00
Target Gross Margin	76%
Construction Period (Months)	6
MKT Area Lot Value %	25%
LTV Investment Loans	80%
Initial Equity Percent Required	15%
Points Paid on Loans	2%
Base Projections	
Completed Value	$240,000.00
Loan Amount Available	$192,000.00
Initial Equity Required	$36,000.00
Direct Costs	
Lot Purchase Price	$60,000.00
Construction Cost	$122,400.00
Indirect Costs	
Points Paid	$3,840.00
Interest Paid	$2,835.50
Derived Values	
Additional Equity Required	$0.00
Financing Costs	$6,675.50
Loan Amount Drawn	$153,075.50

Figure 3.2.10 - Construction Phase Improved Loan
(Adapted from Schmitz, 2004,
Shinn, 2008 and Griffin, 2010)

The "Base Projections" are calculated directly from the given assumptions and variables. The completed value is calculated from the lot value using the market area lot value percentage. The loan amount is calculated from the completed value given the assumed loan-to-value. The initial equity is calculated from the completed value and the required initial equity assumption.

$$Completed\ Value = \frac{Lot\ Value}{Market\ Area\ Lot\ Value\ \%}$$

$$Loan\ Amount\ Available = Completed\ Value\ \times LTV\ Investment\ Loans$$

$$Initial\ Equity\ Required = Completed\ Value\ \times Initial\ Equity\ \%$$

Figure 3.2.11 – Build-to-Rent Model – Construction Phase – Base Projection Equations
(Adapted from Shinn, 2008 and Griffin, 2010)

The “Direct Costs” are the hard costs related to construction. The lot purchase price is directly transposed from the given lot value. The construction cost is calculated using the completed value, lot price and target gross margin. The homebuilder’s required gross profit, given the target gross margin, minus the lot purchase price, gives the allowable construction budget to meet the gross profit requirements. The model assumes the construction cost is equal to the budget.

$$Lot\ Purchase\ Price = \ Lot\ Value$$

$$Construction\ Cost = (Completed\ Value\ X\ Target\ Gross\ Margin)\ -\ Lot\ Purchase$$

Figure 3.2.12 – Build-to-Rent Model – Commercial Loan - Direct Cost Equations
(Adapted from Shinn, 2008 and Griffin, 2010)

The model includes the costs of financing the project construction with a commercial AD&C loan. The “Indirect Costs” include points paid at the lot closing and the interest expense, Points paid are determined directly from the loan amount and the given points paid on loans. The interest expense is the most complex calculation of the model. This is because the homebuilder is able to use loan funds to make interest payments. Therefore interest costs must be included in the calculation of total costs, which is used to determine whether the full available loan amount will be drawn upon. In order to avoid a circular reference the model first calculates the interest due on total costs excluding interest paid. This amount is added to the total cost and used to calculate the interest paid. The interest calculation makes use of Excel’s logical reasoning capability via an “If” function. The model determines if the total cost, including interest costs on total costs excluding interest, are less than the loan amount authorized. If the costs are less, then the model calculates interest on the amount of the loan needed to complete construction. If the costs are greater than or equal to the loan amount authorized. The model uses a straight-line projection of loan draws. Thus, interest is calculated on the average amount drawn. The annual loan interest rate is prorated by the months of construction.

$$Total\ Costs = Direct\ Costs + Indirect\ Costs$$

$$Interest\ Paid = \begin{cases} \left\{ \begin{array}{c} If: Total\ Cost < Loan\ Amount\ Available \\ \left(\frac{Total\ Costs}{2}\right) \times \left(\left(\frac{Construction\ Period}{12}\right) \times Loan\ Rate\right) \end{array} \right\} \\ Or \\ \left\{ \begin{array}{c} If: Total\ Cost > Loan\ Amount\ Available \\ \left(\frac{Loan\ Amount\ Available}{2}\right) \times \left(\left(\frac{Construction\ Period}{12}\right) \times Loan\ Rate\right) \end{array} \right\} \end{cases}$$

$$Points\ Paid = Loan\ Amount\ Available\ \times Points\ Paid$$

Figure 3.2.13 – Build-to-Rent Model – Commercial Loan - Indirect Cost Equations (Adapted from Shinn, 2008)

The "Derived Values" are calculated interim results within the model. The additional equity required is the determination if total costs exceed the loan amount available. If the total costs exceed the loan amount and initial investment, the homebuilder must invest additional equity to fund the project. The financing costs show the total costs of financing, points paid plus interest paid. The loan amount drawn is the amount of the loan drawn to complete the home if the entirety of the loan amount available is not used to complete the home. Otherwise, the loan amount drawn is equal to the total loan amount available, the remaining costs being funded with additional equity.

$$Additional\ Equity = \begin{cases} \begin{Bmatrix} If: Total\ Cost > Loan\ Amount\ Available + Initial\ Equity \\ Total\ Cost - Loan\ Amount\ Available + Initial\ Equity \end{Bmatrix} \\ Or \\ \begin{Bmatrix} If: Total\ Cost > Loan\ Amount\ Available + Initial\ Equity \\ 0 \end{Bmatrix} \end{cases}$$

$$Financing\ Costs = Interest\ Paid + Points\ Paid$$

$$Loan\ Amount\ Drawn = \begin{cases} \begin{Bmatrix} If: Total\ Cost - Initial\ Equity < Loan\ Amount\ Available \\ Total\ Cost - Initial\ Equity \end{Bmatrix} \\ Or \\ \begin{Bmatrix} If: Total\ Cost - Initial\ Equity > Loan\ Amount\ Available \\ Loan\ Amount\ Available \end{Bmatrix} \end{cases}$$

Figure 3.2.14 – Build-to-Rent Model – Commercial Loan – Derived Value Equations (Adapted from Shinn, 2008, Schmitz, 2004 and Griffin, 2010)

The build-to-rent model does not include a marketing phase as it is assumed the property will be financed for long-term ownership and offered for rent immediately upon completion. Figure 3.2.15 shows the permanent phase of the basic build-to-rent model as it appears in Excel.

Rental Phase

Assumptions	
Vacancy	1/24
Selling Expenses %	5.00%

Loan Terms	
Loan Amou	$153,075.50
Rate	6%
Term	30
PMT Annu	($11,120.77)

Reversion	
Year 10 Sales Price	$356,662.83
Loan Balance	$127,554.34
Selling Expenses	$17,833.14
BTER	$211,275.35

Derived Variables	
Acquisition Equity	$36,000.00
Market Rent	$ 19,200.00

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
NOI	$ 19,200.00	$20,064	$20,967	$21,910	$22,896	$23,927	$25,003	$26,129	$27,304	$28,533
DS	($11,121)	($11,121)	($11,121)	($11,121)	($11,121)	($11,121)	($11,121)	($11,121)	($11,121)	($11,121)
BTCF	$ 8,079.23	$8,943	$9,846	$10,790	$11,776	$12,806	$13,883	$15,008	$16,184	$17,412

DCF	Cash Flow 0	Cash Flow 1	Cash Flow 2	Cash Flow 3	Cash Flow 4	Cash Flow 5	Cash Flow 6	Cash Flow 7	Cash Flow 8	Cash Flow 9
	-$36,000.00	$8,079	$8,943	$9,846	$10,790	$11,776	$12,806	$13,883	$15,008	$227,459
IRR	38.4394%									

Figure 3.2.1.5– Build-to-Rent Model – Improved Loan – Permanent Phase
(Adapted From Miles et. Al, 2007 and Fisher & Martin, 2004)

The “Derived Variables” are prerequisite values for the model calculated from the base inputs. “Acquisition Equity” is calculated as the difference between the purchase price, assumed to be the home value, and the loan amount. The “Market Rent” is calculated as a function of the home value using the capitalization rate.

$$Purchase\ Price = Completed\ Value\ of\ Construction$$

$$Market\ Rent = Home\ Value\ \times\ Capitalization\ Rate$$

$$Acquisition\ Equity = Initial\ Equity + (Loan\ Amount - Construction\ Loan\ Amount\ Drawn)$$

Figure 3.2.16 – Build-to-Rent Model – Permanent Phase – Derived Variables
(Adapted from Miles et. Al, 2007 and Fisher & Martin, 2004)

The “Reversion” is the projected conditions of the sale of the property at the end of the investment term. The sales price is calculated from the final year’s rent using the capitalization rate. The loan balance is calculated using Excel’s finance functions given the loan terms and investment term. Selling expenses are the percentage set by the user of the Year 10 sales price.

$$Sales\ Price = \frac{PGI\ (Year\ 10)}{Capitalization\ Rate}$$

$$Selling\ Expenses = Selling\ Expense\ \% \times Sales\ Price$$

Figure 3.2.17 – Single Family Rental Model – Reversion
(Adapted from Miles et. Al, 2007 and Fisher & Martin, 2004)

The annual before tax cash flow, BTCF, is the net operating income less debt service.

$$Before\ Tax\ Cash\ Flow = Net\ Operating\ Income - Debt\ Service$$

Figure 3.2.18 – Single Family Build-to-Rent Model – BTCF
(Adapted from Miles et. Al, 2007 and Fisher & Martin, 2004)

The final Discounted Cash Flow, DCF, shows the annual net cash flow per year. Year "Zero" is the initial cash investment to acquire the property or "Acquisition Equity", shown as a negative cash flow. The succeeding year's cash flow are the annual "BTCF", excepting the final year which is the "BTCF" plus the "Equity Reversion". The "Internal Rate of Return" are calculated from these cash flows using Excel's IRR function.

3.3 Input Variable Calculations

This chapter describes the research and calculations used to determine the ranges tested for the defined key variables.

3.3.1 Confirming Input Variables

The background research, literature review and model design suggest that the input variables with the largest impact on the outcome of the project are a baseline interest rate (the US Treasury Rate), a risk premium for residential rental property, a growth (inflation) rate, and the capitalization rate for single family homes. Since the baseline interest rate and risk premium are only used in conjunction for sensitivity analysis they can be combined into a single input displaying the possible range, from the sum of the minimum of each rate to the sum of the maximum of each rate. However, in order to improve the efficacy of the results it was decided to test whether any other input assumptions have a large potential impact on the output. Figure 3.3.1 shows the percent change in IRR from a 50% change in the input assumptions, variables and terms of the basic build-to-rent model described in Section 3.2.1

Key Variables	Δ in Input	% Δ in IRR
Discount Rate	50%	932.60%
Capitalization Rate	50%	-51.68%
Inflation Rate	50%	-26.12%
Assumptions		
Lot Value	50%	0.00%
Construction Period (Months)	50%	-4.03%
MKT Area Lot Value %	50%	0.00%
Points Paid on Loans	50%	-5.38%
Selling Expenses %	50%	10.42%
Vacancy	50%	5.04%
Target Gross Margin		N/A
LTV Investment Loans		N/A
Initial Equity Percent Required		N/A

Figure 3.3.1 - Variable Sensitivity

The findings support the conclusion that the combined discount rate, capitalization rate, and inflation rate are the most significant input variables in the model. There are three input assumptions that should not be adjusted significantly. The target gross margin is a business decision related to the appropriate cost of construction, and concurrent size and quality, of the home given the lot value and market area. A change in the cost of the constructed home will have a significant impact on the return. However, investors should be extremely cautious attempting to cut costs during construction. The expected home value is predicated on the size and quality of the home being appropriate for the market area. Building a smaller or lower quality home than the market calls for will potentially negatively impact rental rates. Therefore the target gross margin is not an appropriate input to alter significantly without a change in business strategy. The loan to value offered and the equity required are both variable, but are expected to stay within a

relatively narrow range. A change in either value would have an impact on the project success. However, these terms will be known, with certainty, at the outset of the project, so measuring their sensitivity is less crucial.

3.3.2 Capitalization Rate Range for Single Family Detached Homes

The literature review revealed several accepted methods of calculating capitalization rates for use in financial analysis. In order to determine a capitalization rate range with a high degree of confidence three diverse methods were used to calculate rates, an analysis of overall market data, the band of investments technique, and the REIT deconstruction method. The results of the three methods were analyzed to establish an appropriate overall range of capitalization rates for the build to rent model sensitivity analysis.

3.3.2.1 Single Family Capitalization Rate – Overall Market Data

Following the method employed by Restoy and Ayuso (2007) in comparing national markets, in the following analysis a rental rate is derived from the American Home Survey and the CPI rental equivalency (AHS, 2009; BLS, 2013a). A house price is provided by American Community Survey. These values are used to calculate a national single family capitalization rate. The CPI rental equivalency reflects the change per period in the average of all per unit rents in the survey area (BLS, 2013b). As this reflects actual rents paid it is equivalent to the effective gross income from the rental properties. In order to derive a net operating income from the effective income a factor for operating

expenses needs to be included. This is accomplished by adjusting the gross rents by the average non-utility operating costs of single family homes as found by Emrath (2012). Using this method overall capitalization rates for the years 1996-2011 were calculated. By this analysis, over the period, single family capitalization rates ranged from 3.46% to 4.57% Figure 3.3.2 shows the derived capitalization rates using this method for the years 1996-2011:

Year	Median Rent	Median Home Price[3]	OE Adjusted Rent	Derived Cap Rate
2011	$1,052[1]	$ 227,200	$ 770	4.07%
2010	$1,034[2]	$ 221,800	$ 759	4.11%
2009	$1,045[1]	$ 216,700	$ 776	4.30%
2008	$1,022[2]	$ 232,100	$ 734	3.79%
2007	$1,015[1]	$ 247,900	$ 707	3.42%
2006	$974[2]	$ 246,500	$ 667	3.25%
2005	$847[1]	$ 240,900	$ 548	2.73%
2004	$822[2]	$ 221,000	$ 548	2.98%
2003	$799[1]	$ 195,000	$ 557	3.43%
2002	$776[2]	$ 187,600	$ 544	3.48%
2001	$789[1]	$ 175,200	$ 571	3.91%
2000	$755[2]	$ 169,000	$ 545	3.87%
1999	$743[1]	$ 161,000	$ 543	4.05%
1998	$720[2]	$ 152,500	$ 531	4.18%
1997	$665[1]	$ 146,000	$ 484	3.98%
1996	$646[2]	$ 140,000	$ 472	4.05%

[1]American Home Survey Annual Value – New Construction
[2]Adjusted by CPI Rent Factor from Adjacent Year
[3]American Community Survey

Figure 3.3.2 - National Average Cap Rate
(AHS, 2009, BLS, 2013a, US Census, 2012)

3.3.2.2 Single Family Capitalization Rate – Band of Investments Technique

The band of investments technique is ordinarily calculated from a single property's financial characteristics. It approaches the capitalization rate from a theoretical standpoint and attempts to compile the capitalization rate from its determinant factors. In this analysis proxy data was used to attempt to emulate a band of investments technique against the overall single family market. The band-of-investments technique calculates capitalization rates as (Devaney, 2005):

$$R_O = M \times R_M + (1-M) \times R_E$$

Where: M = the loan-to-value ratio
RM = the mortgage capitalization rate
RE = the equity capitalization rate (equity dividend rate)

Figure 3.3.3 – Band-of-Investments Technique
(Devaney, 2005)

In this analysis, the annual average U.S. national rate was derived using the American Housing Survey (AHS, 2009) per the method of Duca, Muellbauer, & Murphy (Duca et al, 2011), the average annual U.S. national mortgage rate from Freddie Mac's Primary Mortgage Market Survey (Freddie Mac, 2013) and S&P 500 Dividend Yield data compiled by Robert Schiller (2013) as a proxy for the equity return rate.

	Loan To Value[1]	Average Mortgage Rate[2]	Equity Dividend Rate[3]	Capitalization Rate
2007	92%	7.81%	1.87%	7.34%
2006	91%	7.60%	1.76%	7.04%
2005	93%	6.94%	1.76%	6.58%
2004	92%	7.44%	1.62%	6.95%
2003	91%	8.05%	1.61%	7.44%
2002	89%	6.97%	1.79%	6.37%
2001	89%	6.54%	1.37%	5.97%
2000	87%	5.83%	1.22%	5.23%
1999	87%	5.84%	1.15%	5.21%
1998	87%	5.87%	1.36%	5.28%
1997	88%	6.41%	1.62%	5.83%
1996	88%	6.34%	2.15%	5.82%

Notes:
[1] American Housing Survey and Duca et al.
[2] Primary Mortgage Market Survey
[3] S&P 500 Dividend Yield – Robert Schiller Compiled Data

Figure 3.3.4 - SFD Capitalization Rate - Band of Investments
(AHS, 2009; Duca et al, 2011, Freddie Mac, 2013 and Schiller, 2013)

Compared to the direct calculation from rent and home values this method returned higher rates overall. The most probable source of this variance is that publicly available data on single family loan-to-value ratios primarily reflects owner-occupied properties. Government programs through the Federal Housing Authority, Department of Agriculture and Veterans Administration, among others, offer high loan-to-value loans on owner-occupied homes. This will expand the range of potential capitalization rates to be tested in the model. For comparison, the rates using the historical loan-to-value of commercial mortgages issued by life insurers was also calculated. The mortgage data was tracked by the American Council of Life Insurers (ACLI, 2013). These results are listed in

Figure 3.3.5. In general, the rates returned by this method more closely agree with the rates given by direct comparison of rent and values. The weakness of using this value is that it includes commercial loans for all real estate asset classes. Other asset classes may have more, or less, stringent underwriting requirements on loan-to-value ratio than single family homes. However, like, the data on all single family mortgage loan-to-value, it provides insight into the range of potential capitalization rates for single family build-to-rent investments.

	Loan To Value[1]	Average Mortgage Rate[2]	Equity Dividend Rate[3]	Capitalization Rate
2007	66%	7.81%	1.87%	5.76%
2006	65%	7.60%	1.76%	5.55%
2005	64%	6.94%	1.76%	5.08%
2004	65%	7.44%	1.62%	5.40%
2003	67%	8.05%	1.61%	5.89%
2002	68%	6.97%	1.79%	5.31%
2001	68%	6.54%	1.37%	4.86%
2000	70%	5.83%	1.22%	4.42%
1999	67%	5.84%	1.15%	4.29%
1998	68%	5.87%	1.36%	4.40%
1997	67%	6.41%	1.62%	4.83%
1996	71%	6.34%	2.15%	5.10%

Notes:
[1] American Council of Life Insurers
[2] Primary Mortgage Market Survey
[3] S&P 500 Dividend Yield – Robert Schiller Compiled Data

Figure 3.3.5 - SFD Capitalization Rate - Band of Investments
(ACLI, 2013, Freddie Mac, 2013 and Schiller, 2013)

3.3.2.3 Single Family Capitalization Rate – REIT Deconstruction Method

The traditional methods of calculating capitalization rates rely heavily on market data. During the real estate downturn during 2009, there was a dearth of transactions from which to glean data for comparisons. DeWeese examined possible alternative methods of calculating appropriate benchmark capitalization rates that did not rely on market data. His findings suggested a novel method of calculating capitalization rates using financial data from REITs investing in that asset class. The theoretical basis for this method is that as REITs are merely securitized investment vehicles for real estate asset types, their overall financial data should reflect the fundamentals of the underlying assets. The informed professional investors who control the greatest share of investment capital are likely to understand the investment value of the underlying real estate (Deweese, 2009). Therefore, the interest in investments in REITs should reveal an implied capitalization rate calculable from the REIT's financial data. The equation for this calculation is:

$$\boxed{Implied\ Capitalization\ Rate\ (R_0) = \frac{Annualized\ Net\ Operating\ Income\ (I_0)}{Equity\ Capitalization\ (V_e) + Liabilities\ (V_m)}}$$

Figure 3.3.6 – REIT Deconstruction Method
(Deweese, 2009)

The annualized net income is derived from the income statement. Certain adjustments

have to be made to corporate net income to derive the implied net operating income of the owned properties. For example, any expenses related to acquisitions, dispositions, or corporate overhead need to be separated. Total liabilities are taken from the balance sheet. The equity capitalization is the implied ownership value of the trust, calculated by multiplying the closing share price by the number of outstanding shares. There are currently two public REITs focused on single family homes, Silver Bay Realty, and American Residential Properties. A third, Colony American Homes, has filed for an initial public stock offering, but has not yet conducted it. For the public firms, financial statements are available from their form Q-10 quarterly filings with the Securities and Exchange Commission (American Residential, 2013; Silver Bay, 2013). In the case of Colony American Homes, their form S-11 IPO sheet contains the needed financial information, their equity capitalization was derived from the disclosed number and price of shares intended for offering (Colony American, 2013). The implied capitalization rates for these REITs, current to the second quarter of 2013 are shown in Figure 3.3.7:

	NOI	Equity Cap	Liabilities	Implied Cap Rate
Colony American	$ 7,344	$ 534,278	$ 8,618	1.35%
Silver Bay Realty	$ 12,468	$ 699,842	$ 105,972	1.55%
American Residential	$ 16,252	$ 612,607	$ 8,351	2.62%

Figure 3.3.7 - SFD Capitalization Rate - REIT Deconstruction Technique

These very low cap rates indicate that, at this time, investors are willing to accept a very low return on equity from these funds. It is unlikely that investors believe the single family rental market to be a secure enough investment to warrant such a low return. Since

investors value shares based on expected returns, the preferred explanation for the low rates is that these are new businesses and investors expect their income and/or assets to grow at a fast pace. There are two likely rationalizations for this investor optimism. One is that investors expect the assets, mostly acquired in foreclosure proceedings, to appreciate rapidly and be dispossessed in the short term. This scenario would not be conducive to an enduring single family build to rent market. The other possibility is that investors anticipate that once the acquired assets are fully acclimated into the rental market the gross revenue will increase significantly.

3.3.2.4 Single Family Capitalization Rate – Analysis of Findings

Figure 3.3.8 presents a summary of the results of the various methods of determining a capitalization rate for single family homes.

	Average	Minimum	Maximum
Market Cap Rate	3.72%	2.73%	4.30%
Band of Investments Mortgage	6.26%	5.21%	7.44%
Band of Investments All Real Estate	5.07%	4.29%	5.89%
Overall	**5.02%**	**2.73%**	**7.44%**

Figure 3.3.8: Capitalization Rates Analysis

3.3.3 Discount Rate Range for Single Family Detached Homes

3.3.3.1 Risk Free Rate for Single Family Detached Homes

Real estate is considered a long term asset. Miles et al. suggest the ten-year Treasury Bond rate is the standard risk-free rate for real estate investors (Miles et. al, 2007). The data for ten-year United States Treasury bond yields since 1996 is shown in Figure 3.3.9. The average ten-year Treasury yield for the period is 4.48%. The range for the period is 1.80% to 6.44%.

Year	Bond Yield
2012	1.80%
2011	2.78%
2010	3.22%
2009	3.26%
2008	3.66%
2007	4.63%
2006	4.80%
2005	4.29%
2004	4.27%
2003	4.01%
2002	4.61%
2001	5.02%
2000	6.03%
1999	5.65%
1998	5.26%
1997	6.35%
1996	6.44%

Figure 3.3.9: Ten-Year United States Treasury Bond Yields
(Federal Reserve, 2013)

3.3.3.2 Risk Premium for Single Family Detached Home Investment

Shilling (2003) analyzed surveys of real estate investors, from 1988 to 2002 and found that investors' expected risk premiums stayed within a narrow range of 6 to 6.25% across , but found that actual returns were significantly lower than the expectations. Ruff (2007) found that actual risk premiums on real estate averaged 4% since 1965 and, excepting a volatile period between 1979 and 1985, risk premium values stayed within a range of 3 to 6%.

3.3.3.3 Combined Discount Rates for Single Family Detached Home Investment

The range of combined discount rates from the data gathered in the previous section is shown in Figure 3.3.10. The range of risk free rates is derived from the ten-year United States Treasury Bond yields, as shown in Figure 3.3.9. The risk premium values range encompasses the range of values ascribed in the literature as explained in section 3.3.3.2, 3% to 6.25%. The calculated rates show a range of possible values between that calculated from the sum of the lowest respective values indicated for each rate and the highest respective values indicated. Fisher and Martin (2004) suggest that the most comparable market return rate to real estate investments are Baa junk bonds. They further argue that comparison of return rates with investment alternatives is a preferable method of determining discount rates for income property evaluation than the additive method used above. They argue that building a discount rate from its theoretical components increases uncertainty about the end result, as any error in each component compounds the error in the derived rate (Fisher & Martin, 2004). Since 1980, Baa bond yields have

ranged from a high of 13.67% to a low of 4.94%. These values closely mirror the calculated discount rates, further supporting the findings (St. Louis Fed, 2013).

Relative Value	Risk Free Rate	Risk Premium	Combined Rate
Low	1.75%	3.00%	4.75%
	2.00%	3.18%	5.17%
	2.25%	3.35%	5.60%
	2.50%	3.53%	6.02%
	2.75%	3.70%	6.45%
	3.00%	3.88%	6.88%
	3.25%	4.05%	7.30%
	3.50%	4.23%	7.72%
	3.75%	4.40%	8.15%
	4.00%	4.58%	8.57%
	4.25%	4.75%	9.00%
	4.50%	4.93%	9.43%
	4.75%	5.10%	9.85%
	5.00%	5.28%	10.28%
	5.25%	5.45%	10.70%
	5.50%	5.63%	11.13%
	5.75%	5.80%	11.55%
	6.00%	5.98%	11.98%
	6.25%	6.15%	12.40%
High	6.50%	6.33%	12.83%

Figure 3.3.10 - Calculated Discount Rate Range

3.3.4 Inflation Rate Range for Single Family Detached Homes

The Federal Housing Finance Administration reports a 3.3% annual compound growth rate for home values (FHFA, 2013) For comparative values, Shilling (2003) found a growth rate for apartment homes of 3.23% whereas Ruff (2007) suggests that real estate income growth closely tracks inflation over the long term. Inflation in the United States, since 1980, as calculated from the Consumer Price Index has averaged 3.6% (BLS, 2013a).

3.3.5 Assumption Values

The model uses several input assumptions which are input values that have less impact or sensitivity on the results of the model. However, it is important that these values be as accurate as possible for the best results from the model. The Lot Value Percentage and Market Area Percentage have no impact on the output. This is because the final market value, or sales price, is assumed to correlate to this value. A higher initial value increases the numerical final return, but does not affect the return rate. Historical data from the NAHB Economics Group (2012) shows that the average percentage of sales price devoted to lot costs has stayed within a narrow range of 24 to 26 percent. A value of 25% was used for the Lot Value Percentage in the sensitivity analysis. A lot value of $60,000 was used. At a 25% Lot Value Percentage a $60,000 lot results in a home value of $240,000, which is in the range of median home values over the past ten years as reported by the US Census (2012a). According to the US Census (2013b) the average home construction timeline since 2000 for homes built-for-sale is 5.9 months, a rounded value of 6 months was used for analysis. The average of the data points on cost of financing since 1969 was 2.9% (NAHB Economics Group, 2012). However, this data includes periods of exceptionally high interest rates in the 1970s when additional points were paid in order to reduce interest rates. A value of 2% was selected to be representative of the market. According to the NAHB, in a healthy market, the typical home construction project should have a gross profit of 22-27%, a Target Gross Margin of 76% was chosen for the analysis (NAHB Economics Group, 2012). The industry standard for loan to value on construction loans is that the loan amount should not exceed 85 percent of the anticipated appraised value of the finished home (Wedewer, 2006). The 15% required initial equity reflects the industry standard loan to value ratio. On the current loan model an additional 10% of the permanent mortgage is required as an equity investment. This amount, combined with the initial equity and uncaptured value added through construction brings the equity percentage on the permanent financing into the 30% range

representing the standard for investment mortgages (NAR, 2013). The US Census Bureau tracks rental vacancy rates, however the recorded data is on the percentage of units vacant at a given time. A property analysis requires a projection of the percentage of time a particular unit will be vacant. The US Census (2013) reports an aggregate 8.1% vacancy for single family rental units 2012. Assuming all rental units are equal, this would equate to approximately one month of vacancy per year. A brand new home may be a more appealing housing option, so a vacancy of 1 month out of every 24 months was selected for the analysis. Selling Expenses are the costs related to selling the home at the end of the investment period. A 5% rate was assumed based on the five to six percent of sales price reported by homebuilders for selling expenses (Taylor, 2013).

3.4 Procedures

Each model was tested for the sensitivity of the key variables within the historical ranges of input parameters established by the research. The model will allow measurement of the projected sensitivity of the investment viability to fluctuations in the key parameters. The measure of the outputs will be the investor's annualized return on investment. The return on investment in a build-to-rent project must be competitive with alternative investment options for the business model to be viable. Each model will use a 10-year investment horizon. This time frame was selected in order to match the return on 10-year treasury bonds, the baseline return rate source.

3.4.1 Sensitivity Analysis Method

A variety of tools exist for conducting sensitivity analysis on financial models. These programs vary in availability, cost and quality. Microsoft's Excel spreadsheet program was chosen to operate the model. Microsoft's Office suite is the standard productivity suite available to users in the United States. There are a variety of alternative programs, including some open source solutions, which are compatible with the Office

Suite. Nearly all home building firms, including small firms, have access to Excel or a similar spreadsheet platform. Designing and operating the models within these programs allows for the greatest application of the results in the industry. Excel offers three "What if" tools that can be used for sensitivity analysis, scenario manager, goal seek and data tables. A scenario manager allows a number of input scenarios to be programed and run. These scenarios must be individually designed, when testing a significant number of entry data points this is a highly time-consuming and limited process. However, the scenario manager is the best tool for testing models with a large number of inputs of limited variability. Goal seek allows a backwards looking analysis, a target output value can be set and the tool will provide the input value, for a single variable, needed to achieve that value. This is useful for answering questions such as the minimum viable discount rate, given a set value for other inputs, to achieve a given return rate. The most versatile tool is the data table. This allows the creation of a matrix showing the output values given a varying range of two variables. A third variable can be tested by creating a series of tables. For this analysis, discount rates and capitalization rates will be the table values. A series of tables will be created for various income growth rates as the range for income growth rates is smaller and less volatile than the other variables. Many popular software suites use a Monte Carlo simulation to predict outcomes. Palisades' @Risk software is a commonly used example of such a program. Monte Carlo simulations are best used to test models with uncertainty regarding variables and predictable probabilities. The goal of the analysis is to determine discrete benchmarks for the build-to-rent business and therefore a one-at-a-time method is more appropriate. Another option considered was using Microsoft's database program Access, which is capable of

linking with Excel, to collate and track the input data and model results. This solution would require advanced VBA or SQL programing language and a significantly more complicated model. This could offer greater flexibility and more in depth analysis, such as the ability to evaluate more variables in a single test run. Such a solution would be less accessible to other users. Future investigation may indicate a more complex financial model, in which case this solution may be valuable.

3.4.2 Input Ranges and Data Points

In order to conduct sensitivity analysis on the developed models it was necessary to select a data series within the ranges of the input variables determined in the research. The calculated historical range for discount rates was 4.75% to 12.83%. This being the variable with the broadest range it was selected to be the variable on the long axis of the output table. Fitting the output table on a single page with proper formatting allows for 15 data points on the long axis. Fifteen evenly distributed values from 4.75% to 12.83% were selected to test the sensitivity of the model output to variations in the discount rate. Figure 3.4.1 displays the selected data points.

1	4.75%
2	5.33%
3	5.90%
4	6.48%
5	7.06%
6	7.64%
7	8.21%
8	8.79%
9	9.37%
10	9.94%
11	10.52%
12	11.10%

13	11.68%
14	12.25%
15	12.83%

Figure 3.4.1 - Discount Rate Range

The historical range for capitalization rates was 2.73% to 7.44%. This being the variable with the second broadest range it was selected to be the variable on the short axis of the output table. Fitting the output table on a single page with proper formatting allows for 11 data points on the short axis. Eleven evenly distributed values from 2.73% to 7.44% were selected to test the sensitivity of the model output to variations in the capitalization rate. Figure 3.4.2 displays the selected data points for capitalization rates.

1	2.73%
2	3.20%
3	3.67%
4	4.14%
5	4.61%
6	5.09%
7	5.56%
8	6.03%
9	6.50%
10	6.97%
11	7.44%

Figure 3.4.2 - Capitalization Rate Range

The historical range for income growth rates has remained close to 3.3%. In order to test a broader potential range of this important input it was decided to test values within approximately a 50% variation of the average value of 3.3%. This being the

variable with the narrowest range it was selected to be the variable which was represented in a series of output tables. Six output tables will be created for each model type, one for each 0.5% multiple between 2% and 4.5%. Figure 3.4.3 displays the selected data points for capitalization rates.

1	2.00%
2	2.50%
3	3.00%
4	3.50%
5	4.00%
6	4.50%

Figure 3.4.3 - Income Growth Rate Range

3.4.3 Output Data Formatting

The outputs for each model will be presented in a series of six data tables. The long (column) axis will display the discount rate range, the short (row) axis will display the capitalization rate range, each table will show the values for one income growth rate data point. The data tables will display a matrix of possible IRRs for each combination of discount rate and capitalization rate within the ranges. Each data table will contain 165 IRR output possibilities, with six income growth tables per model, a total of 990 output data points will be measured for each model. The raw data output tables will be supplied in Appendix C.

CHAPTER 4: RESULTS

4.1 Internal Rate of Return on Investment

This chapter will describe and discuss the internal rate of return results for each model. For reference, the raw data output tables are shown in Appendix C. If possible, for both model designs, the limit of feasibility for each key input will be identified. That is, the value for the input at which the model predicts the project will be unsuccessful when the other inputs are at optimal values. There are several general patterns in the data that are relevant to all models.

4.1.1 Discount Rate Effects

In general as the discount rate increases, the IRR decreases. This is expected, as the discount rate represents the cost of capital, a higher discount rate equates to a higher debt service expense and lower cash flow each year. A higher discount rate slows the amortization of the loan principle increasing the loan balance at the 10 year investment horizon, lowering the before tax equity reversion.

4.1.2 Capitalization Rate Effects

For all models, as the capitalization rate increases, IRR increases. This is as expected. The capitalization rate describes the rental rate relative to property value. As the discount rate increases, the revenue relative to value increases. For a given property

value a higher capitalization rate equates to a higher annual revenue return. An observer might expect that a high capitalization rate would also have a deleterious effect on the final year equity reversion, as it determines the sales price from the final year's revenue. Since a higher capitalization rate represents a lower value relative to a given rent, it might be assumed that a higher capitalization rate would give a lower final year value from the consequent rent. However, the initial rent is a function of the initial value and the final value is a function of the final rent. The capitalization is the ratio of each set of values. So, the value at year 10 is, ultimately, determined by the initial value and the income growth rate. Figure 4.1.1 displays this graphically:

$$Capitalization\ Rate = \frac{NOI\ Year\ 1}{Initial\ Value} = \frac{NOI\ Year\ 10}{Year\ 10\ Value}$$

Figure 4.1.1 – Single Family Rental Model – Reversion
(Adapted from Miles et. Al, 2007 and Fisher & Martin, 2004)

4.1.3 Income Growth Rate Effects

As the income growth rate increases the relative IRRs for each discount rate and capitalization rate increase. This is due to the income growth rate's role in setting growth in rental rates throughout the life of the project. Further, since the direct capitalization method states value as a function of income potential, a higher income growth rate results in a higher return from the final reversion. However, investors should bear in mind that the income growth is expected to track inflation and a high income growth may equate to a high inflation environment. Under such a scenario it would be expected for interest rates and returns on other investments to also be higher. These factors indicate the possibility of adverse effects on real returns and returns relative to opportunity costs.

4.2 Investor-Level Commercial Loan Model Internal Rate of Return

Several trends are seen in each iteration of the Investor-Level Commercial Loan Build-to-Rent model. All else being equal, as the discount rate increases, the IRR decreases. Likewise, as the capitalization rate increases, IRR increases and as the income growth rate increases, the IRR increases. For reference of the values discussed below, the full array of outputs for this model is shown in Appendix C.

Of the 990 variable groupings measured, 707 had a positive annualized return. So, 283, or 28.6%, of the iterations showed a loss for the modeled build-to-rent project. So, if the variables were totally random, a build-to-rent project with conditions matching the model would have a confidence of success in excess of 70%. The model shows a maximum potential return under this scenario of 22.86%. This IRR is seen in the model iteration where the income growth rate and capitalization rate are at the maximum of the predicted range and the discount rate is at the minimum. In the opposite situation, with the inputs at their least desirable values, the IRR shows a -17.94% loss. The spread between the maximum and minimum annualized return under this scenario is over 40%, this indicates that the build-to-rent business demonstrated in this model has the potential for both high returns and large losses. That divergence suggests that a build-to-rent product is likely to be a risky investment. The model showed a positive return only for iterations with a discount rate lower than 5.90%. Less than half of the iterations with a discount rate above 10.52% give a positive return. Under this model, a discount rate of 9.94% is the upper limit where the investor can expect a positive outcome. Regarding capitalization rates, no capitalization rate level gave positive results in all iterations.

However, at the 6.97% level, only the least desirable combination of the other two input variables showed a loss. At the 6.97% level, and above, ninety percent of the iterations have positive returns. So, a rate of 6.97% or higher provides a confidence of a positive return under this model, but not with certainty of the basic model. At around the 3.67% level 50% of the iterations display negative returns. All capitalization rate values higher than 3.67% have more than half of their respective iterations showing a positive return. The 3.67% level is the minimum capitalization rate where an investor can have a high degree of confidence of financial success for their project.

Historically, the income growth rate is variable, but has remained between 3% and 4%, except in limited circumstances. At the 3.5% income growth level, a capitalization rate above 6.03% and a discount rate below 8.21% give a high confidence of a positive return. That is, if an investor feels that this model type accurately reflects their business environment and is confident that income growth rates will be above 3.5%, capitalization rates will be above 6.03% and a discount rates will be below 8.21%, then that investor can be confident that a build-to-rent product will be successful. Under other predicted variable combinations, the investor should use the model to determine the likely outcome. Figure 4.2.1 shows the outputs at the 3.5% income growth level. The IRRs are plotted on a graph of the IRRs versus the discount rate, with a line for the IRRs at each capitalization rate. The chart graphically reflects the above analysis.

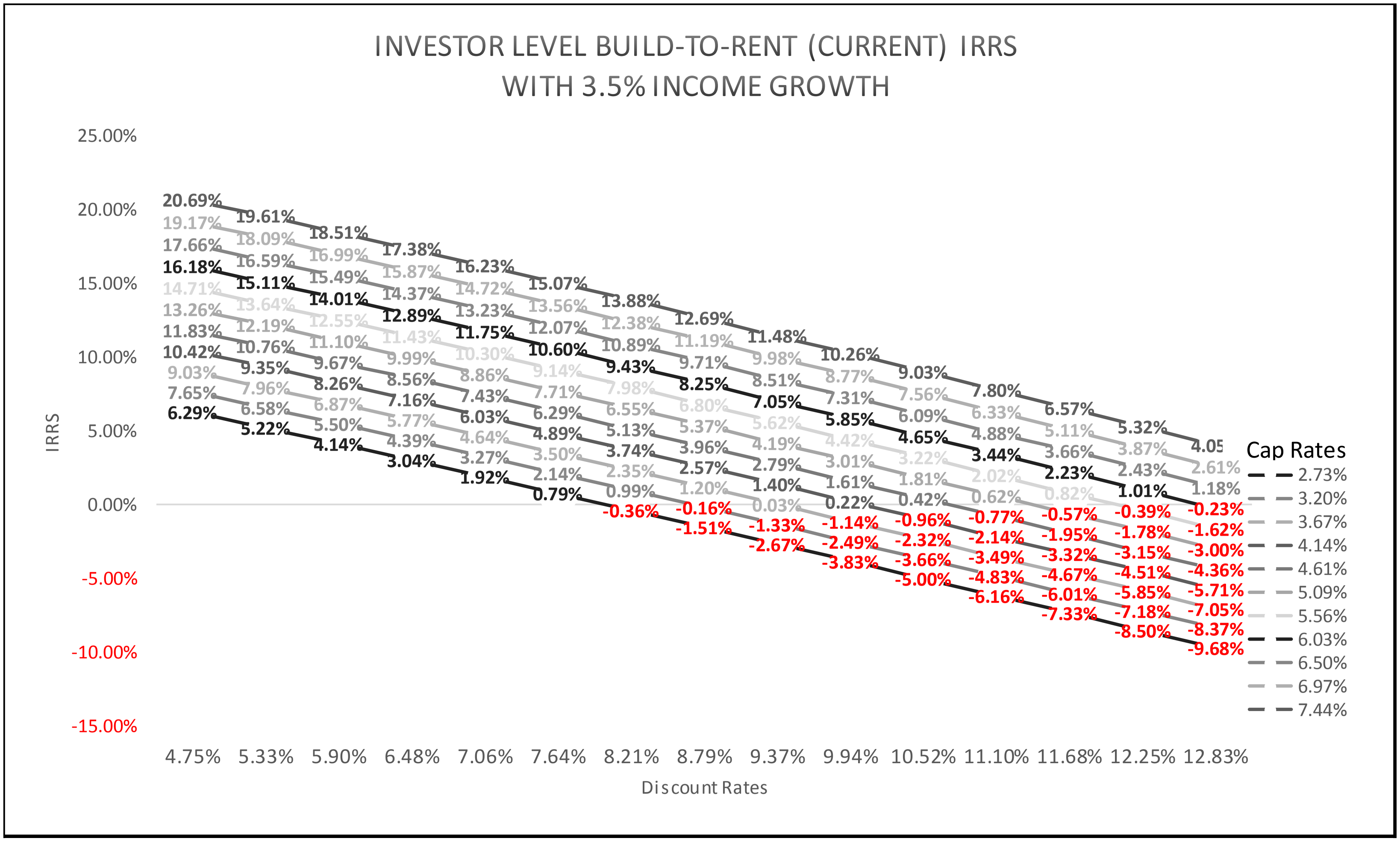

Figure 4.2.1 Investor Level Build-to-Rent - IRRs

4.3 Investor-Level Improved Loan Product Model Internal Rate of Return

As previously discussed, in each iteration of the Investor-Level Commercial Loan Build-to-Rent model. All else being equal, as the as the discount rate increases, the IRR decreases. Likewise, as the capitalization rate increases, IRR increases and as the income growth rate increases, the IRR increases. For reference of the values discussed below, the full array of outputs for this model is shown in Appendix D.

As anticipated, the model showing an improved financing mechanism for a build-to-rent product has a higher level of success. Of the 990 variable groupings measured, 977 had a positive annualized return. So, only 13, or 1.31%, of the iterations showed a loss for the modeled build-to-rent project. This indicates that under most scenarios, a build-to-rent project with conditions matching the model would have a high confidence of success. The model shows a maximum potential return under this scenario of 38.63%. This IRR is seen in the model iteration where the income growth rate and capitalization rate are at the maximum of the predicted range and the discount rate is at the minimum. In the reverse situation, with the inputs at their least desirable values, the IRR shows a negative 4.37% loss. The spread between the maximum and minimum annualized return under this scenario is over 40%, but very few of the iterations show a loss. That divergence indicates that a build-to-rent product has a wide range of possible returns, but is not an especially risky investment. The model showed a negative return only for iterations with a discount rate higher than 10.52%. All lower discount rates give a high certainty of success. Regarding capitalization rates, capitalization rates above the 4.14% level gave positive results in all iterations. However, even at the minimum 2.73% level,

only the least desirable set of other input variables showed a loss. At all capitalization rate levels, ninety percent or more of the iterations have positive returns. There were numerous combinations of discount rates and capitalization rates that showed a positive outcome at each income growth level.

Historically, the income growth rate is variable, but has remained between 3% and 4%, except in limited circumstances. At the 3.5% income growth level, a capitalization rate at the minimum of the range and a discount rate at the maximum still give a low, but positive, IRR of 1.28%. Thus, if an investor feels that this model type accurately reflects their business environment and is confident that income growth rates will be above 3.5%, regardless of the other factors, then that investor can be confident that a build-to-rent product will be successful. Figure 4.3.1 shows the outputs at the 3.5% income growth level. The IRRs are plotted on a graph of the IRRs versus the discount rate, with a line for the IRRs at each capitalization rate. The chart graphically reflects the above analysis.

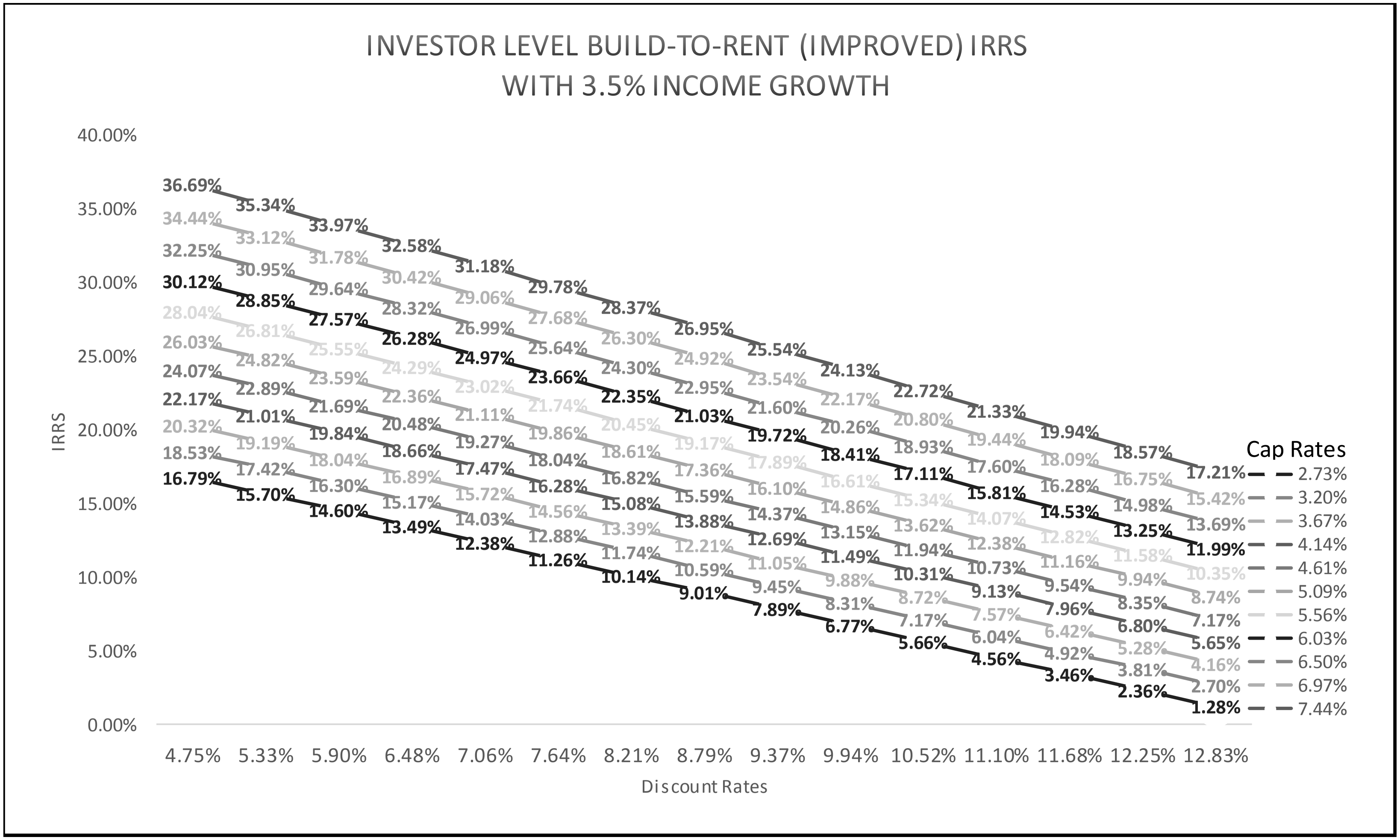

Figure 4.2.2 Investor Level Build-to-Rent (Improved) - IRRs

CHAPTER 5 CONCLUSIONS

5.1 Conclusions

The developed models indicate that the build-to-rent product does have the potential to be a successful business venture. In light of the general results, it can be concluded that the ideal build-to-rent investment environment, respective to IRR, is one with a high capitalization rate, high income growth rate and low discount rates. One of the initial observations related to the build-to-rent business was that it had seen a rise in popularity concurrent with the extreme market conditions following the recession of 2007. One key question was whether the build-to-rent model would only be successful under similar extreme conditions and not in normal markets. However, under each of the scenarios tested, moderate values in the range of the inputs indicated positive returns. Therefore, the build-to-rent model can be expected to be successful under normal market conditions. Nonetheless, the models did reveal a possible barrier to wide acceptance of build-to-rent as a business alternative to build-to-sell. While the annualized returns were positive in most scenarios, the initial cash flows from the project were variable. For most scenarios the vast majority of the investment return came from the sale of the property at the end of the 10 year investment horizon. In a build-to-rent project, although the returns over 10 years may have the potential to be higher than building single family homes each year, the annual cash flow is likely to be lower except for the year of sale. For most small firms, waiting ten years for a return on their investment is unfeasible. However, for larger firms, or investors with significant capital, build-to-rent has the potential to offer significant, stable, long term returns. For smaller firms, although build-to-rent may not be

a feasible core business, on the right project it might be a successful side business. Build-to-rent is a business requiring similar skills and tools to traditional home building that offers the opportunity for long-term growth of cash value. A home builder might be able to invest in a limited number of build-to-rent projects as a complement to their core business. Since the rental property is a long term investment, the product offers the potential for recession-resistant cash flow.

The major differences in the build-to-rent product, versus more traditional products, can be classified into two categories. Compared to build-to-sell, the homes are rented rather than sold. Compared to typical rental properties, the homes are new construction rather than properties acquired through distressed sales. The historical data on homebuilder net income since 1970 averages 5.2%, with a high of 10.0% in and a low of -3.0% in 2008 (NAHB Economics Group, 2012). There is a high degree of variability in net income across the business cycle. One of the major challenges for home builders is managing these uneven cash flows, saving profits from good years to support the business through lean years. Build-to-rent offers an opportunity for builders to smooth their earnings. Home builders may be able to defer a portion of their earnings in good years, through renting some of their homes rather than selling. Then rely on these properties, either through the rental income or selling the assets, in difficult years.

One of the goals was to establish guideline input values for the prospective build-to-rent business. That is a market discount rate or capitalization rate at which build-to-rent projects should be undertaken versus an alternative project. The model demonstrating current financing conditions resulted in the following general conclusions: an income growth rate level above 3%, a capitalization rate above 6% and a discount rate

below 8% give a high confidence of a positive return. Homebuilders should seek these market conditions when considering a potential build-to-rent project. However, differences in financing structure have an impact on the investment return as large as any of the key inputs. It is difficult to draw additional in-depth conclusions with broad relevance to all possible business models. Therefore these guidelines should not be viewed as the sole consideration of market conditions where a build-to-rent project should be undertaken or avoided. Decision makers should use, or adapt, one of the models created to reflect the individual business environment of their firm and the project for the best results.

CHAPTER 6: RECOMMENDATIONS

6.1 Industry Recommendations

The build-to-rent business model has the potential to be a viable industry for real estate investors and home building firms. However, the research identified some areas of concern where industry action could improve the feasibility of build-to-rent projects.

Most importantly, financing tools and guidelines for build-to-rent projects should be be established. As it stands, there are limited options to finance a build-to-rent project. The principal of a small firm could personally secure an investment mortgage to purchase a constructed home from the firm. However, an individual's access to credit would not likely support an ongoing business line of build-to-rent projects. At present, a firm with access to a large capital base may be able to self-finance a number of projects. But even many large investment trusts seek to leverage their capital to expand their revenue potential.

An ideal loan for build-to-rent projects would be a financing product similar to a construction-to-permanent mortgage currently available to some homeowners. Such a loan would simplify the process for both lenders and borrowers by providing a comprehensive source of funds for the project, a single set of loan terms, and a single loan closing. Such a product would take into account the equity value created in the development and construction of the home. This would allow the builder to invest a single equity amount at the inception of the project and not require additional equity to secure permanent financing. For lenders, the build-to-rent product could offer lower risk than other real estate alternatives. The initial equity invested to build the home, plus the

value created in the construction of the home, create a lower loan-to-equity ratio and offer a greater buffer against loan losses. Additionally, the model reflecting such a loan type indicated that the property could offer investors a comparable return at higher interest rates than other financing options. A better financing mechanism would allow lenders to charge a higher interest rate without adversely affecting the viability of the projects.

6.2 Strengths and Limitations of the Model

The designed model is a convenient tool for forecasting the financial success of a build-to-rent project. However, it is important to be aware of the model's limitations. The model is designed to simulate expected market conditions and the characteristics of a build-to-rent project. Much of the research was devoted to describing the bounds of the market conditions that determine the likely market environment. However, if the project conditions vary significantly from these parameters, whether in the overall market or for a particular project, the model will not have merit. Differences in financing structure, business strategy, tax considerations or the physical conditions of the property could have an impact on the investment return as large as any of the key inputs. Users should ensure that the conditions described in the model reflect the parameters of their project.

The model uses a present value relationship, using a capitalization rate, to determine rent values as a function of home value. This method is widely used in analyzing commercial properties. There is evidence that capitalization rates are an effective predictor of single family rental values over the long term. However, the research on single family capitalization rates suggests that the relationship can be skewed over short time ranges (Meese & Wallace, 1994; Ayuso & Restoy, 2007; Bojlov, 2005). The research attributes the short term fluctuations to the home price shifts during periods of high or low demand (Hui & Zheng, 2011). If rental rates remain constant, increasing home prices will lower market capitalization rates, likewise declines in home prices will increase the market capitalization rates. Researchers should use a consistent method of calculating capitalization rates using data from longer periods of time to compensate for potential market fluctuations.

The property pro-forma home construction model used as a component of the model has several limitations that flow through to the composite models. The model is designed as a financial tool to aid in the planning of home construction projects. It is not optimized for risk or sensitivity analysis for the construction stage of the project on factors other than interest rate fluctuations. Costs such as property maintenance, dues and utilities are project dependent and are often influenced by weather, geography and economic factors. An unexpected change in any of these costs could increase the construction cost. The model does not account for this uncertainty. Users of the model should be cognizant of the potential impact of these factors.

The rental portion of the models assumed that the values of the key inputs would remain static throughout the life of the project. This is an assumption used in many financial models. While the interest rate may be fixed for the life of the project, rates may vary. The capitalization rate might vary between the initial year and the final year depending on changes in market conditions. In choosing an appropriate quantitative value for each input, a value reflecting the typical value expected over the life of the project should be used.

Additionally, the focus of the model was on the financial characteristics of a build-to-rent product. Risks not related to the internal financials of a build-to-rent project were not considered. Decision makers should be aware of the specific risks related to their project and plan accordingly.

6.3 Implications for Future Research

The goal of this research was to model the build-to-rent product to aid real estate and construction industry decision makers in analyzing build-to-rent projects as a business alternative. A fundamental financial model of such a product was developed. However, there are a number of economic, financial, and political factors impacting the prospective build-to-rent industry that should be investigated further. Perhaps the most direct extension of these findings would be to consider the tax effects of build-to-rent projects for investors. All of the models referred to in the research used "before tax" income returns. However, there are a variety of tax effects, both advantageous and detrimental that a build-to-rent investor might encounter. Depreciation and interest expense deductions are two of the most common tax benefits available to property owners. The impact of income and capital gains taxes on returns may adversely affect the viability of projects for certain investors. These effects were not considered because models were designed to be applicable to the industry at large, whereas tax situations can be complex and are can be specific to the individual investor and the overall investment portfolio. Investors have differing ownership priorities, such as capital investment, other income, debt characteristics, or additional factors that influence taxation. Identifying and delineating the relevant tax laws that would impact the investors in a build-to-rent project will require additional investigation. Interpretation of tax laws and related accounting criteria may require specialized expertise.

The models assumed that the values of the key inputs would remain static throughout the life of the project. This is an assumption used in many financial models. While the interest rate may be fixed for the life of the project, it might also be adjustable.

The capitalization rate might vary significantly from between the initial year and the final year. A model could be adapted to reflect changing market conditions during the term of the project. Such a model would be very different from the models developed in this research. It would need to focus on the risk probabilities facing a single project, whereas this model was designed to model the environment of many potential projects.

Similarly, the home construction model used as a component of the model has several limitations. The model is designed as a financial tool to aid in the planning of home construction projects. It is not optimized for risk or sensitivity analysis on factors other than interest rates or time-on-market. It does not account for the risk of cost overruns or construction delays. Further examination may indicate that these factors need to be considered more actively in the model. Additionally, the focus was on the financial characteristics of a build-to-rent product. Future research into the physical characteristics, site location, construction methods, and other factors would be valuable to determine the optimal characteristics of a build-to-rent product.

As market conditions are dynamic, so are the demands for a variety of product types from both investors and consumers. Additional research should be considered as it relates to lifestyle preferences among specific consumer types.

Appendix A: Single Family Home Construction Model Formula Display

	B	C	D	E
2		Assumptions		
3			Lot Value	60000
4			Target Gross Margin	0.76
5			Construction Period (Months)	6
6			MKT Area Lot Value %	0.25
7			LTV Investment Loans	0.8
8			Initial Equity Percent Required	0.15
9			Points Paid on Loans	0.02
10		Key Variables		
11			Time-On-Market (Months)	2
12			ADC Loan Rate	0.08
13	Construction Phase			
14		Base Projections		
15			Completed Value	=E3/E6
16			Loan Amount Available	=E15*E7'
17			Initial Equity Required	=(E15*(E8))'
18		Direct Costs		
19			Lot Purchase Price	=E3'
20			Construction Cost	=(E15*E4)-E19'
21		Indirect Costs		
22			Points Paid	=E16*E9'
23			Interest Paid	=((IF((SUM(E19:E22)+((IF(SUM(E19:E22)<E16,SUM(E19:E22),E16)/2) *((E5)/12)*E12))<E16,(SUM(E19:E22)+((IF(SUM(E19:E22)<E16, SUM(E19:E22),E16)/2)*((E5)/12)*E12)),E16)/2)*((E5)/12)*E12)'
24		Derived Values		
25			Additional Equity Requirec	=IF(E19+E20+E22+E23>E16+E17,E19+E20+E22+E23-E16,0)'
26			Financing Costs	=E22+E23'
27			Loan Amount Drawn	=IF(E19+E20+E22+E25+E23<E16,E19+E20+E22+E25+E23,E16)'
28	Marketing Phase			
29			Additional Interest	=IF(E27>E16,E16,E27)*((E11/12)*E12)'
30	Results			
31			Gross Profit	=E15-(E20+E19)
32			Gross Profit Margin	=E31/E15
33			Net Profit	=E15-E27-E17-E29
34			Net Profit Margin	=E33/E15

Figure A.1 - Single Family Home Construction Model Formula Display

Appendix B: Single Family Home Rental Model Formula Display

1	A	B	C	D	E	F	G	H	I	J	K
2	Key Variables							Derived Variables			
3	Discount Rate		5.00%					Acquisition Equity		=C7-E7	
4	Cap Rate		8.00%					Market Rent		=C7*C4	
5	Inflation Rate		2.00%								
6	Assumptions			Loan Terms				Reversion			
7	Home Value		240000	Loan Amount		=C7*C10		Year 10 Sales Price		=K13/C4	
8	Vacancy		1/24	Rate		=C3		Loan Balance		=PV(E8,20,E10,0)	
9	Selling Expenses %		5.00%	Term		30		Selling Expenses		=C9*J7	
10	LTV Investment Loans		80.00%	PMT Annual		=PMT(E8,E9,E7,0)		BTER		=J7-J8-J9	
11											
12		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
13	PGI	=J4	=B13*(1+$C$5)	=C13*(1+$C$5)	=D13*(1+$C$5)	=E13*(1+$C$5)	=F13*(1+$C$5)	=G13*(1+$C$5)	=H13*(1+$C$5)	=I13*(1+$C$5)	=J13*(1+$C$5)
14	V	=-($C$8*B13)	=-($C$8*C13)	=-($C$8*D13)	=-($C$8*E13)	=-($C$8*F13)	=-($C$8*G13)	=-($C$8*H13)	=-($C$8*I13)	=-($C$8*J13)	=-($C$8*K13)
15	EGI	=B13+B14	=C13+C14	=D13+D14	=E13+E14	=F13+F14	=G13+G14	=H13+H14	=I13+I14	=J13+J14	=K13+K14
16	OE	=B13*0.375	=B16*(1+$C$5)	=C16*(1+$C$5)	=D16*(1+$C$5)	=E16*(1+$C$5)	=F16*(1+$C$5)	=G16*(1+$C$5)	=H16*(1+$C$5)	=I16*(1+$C$5)	=J16*(1+$C$5)
17	NOI	=B15-B16	=C15-C16	=D15-D16	=E15-E16	=F15-F16	=G15-G16	=H15-H16	=I15-I16	=J15-J16	=K15-K16
18	DS	=$E$10	=$E$10	=$E$10	=$E$10	=$E$10	=$E$10	=$E$10	=$E$10	=$E$10	=$E$10
19	BTCF	=B17+B18	=C17+C18	=D17+D18	=E17+E18	=F17+F18	=G17+G18	=H17+H18	=I17+I18	=J17+J18	=K17+K18
20											
21	DCF	Cash Flow 0	Cash Flow 1	Cash Flow 2	Cash Flow 3	Cash Flow 4	Cash Flow 5	Cash Flow 6	Cash Flow 7	Cash Flow 8	Cash Flow 9
22		=-J3	=B17+B18	=C17+C18	=D17+D18	=E17+E18	=F17+F18	=G17+G18	=H17+H18	=I17+I18	=J19+J10
23	IRR	=IRR(B22:K22)									

Figure B.1 - Single Family Rental Model Formula Display

Appendix C: Commercial Loan Model Sensitivity Analysis Raw Data

Table C.1 - Investor-Level Commercial Loan IRR's

		Income Growth Rate: 2.00%										
	IRR	Capitalization Rate										
		2.73%	3.20%	3.67%	4.14%	4.61%	5.09%	5.56%	6.03%	6.50%	6.97%	7.44%
Discount Rate	4.75%	1.82%	3.27%	4.75%	6.24%	7.74%	9.26%	10.80%	12.36%	13.93%	15.52%	17.12%
	5.33%	0.55%	2.01%	3.49%	4.99%	6.50%	8.02%	9.56%	11.12%	12.70%	14.29%	15.90%
	5.90%	-0.75%	0.72%	2.20%	3.70%	5.22%	6.75%	8.29%	9.86%	11.44%	13.03%	14.64%
	6.48%	-2.07%	-0.60%	0.89%	2.39%	3.91%	5.44%	6.99%	8.56%	10.14%	11.74%	13.35%
	7.06%	-3.43%	-1.95%	-0.46%	1.05%	2.57%	4.11%	5.66%	7.23%	8.82%	10.42%	12.03%
	7.64%	-4.81%	-3.33%	-1.83%	-0.32%	1.21%	2.75%	4.30%	5.88%	7.46%	9.07%	10.69%
	8.21%	-6.21%	-4.72%	-3.22%	-1.71%	-0.18%	1.36%	2.92%	4.50%	6.09%	7.69%	9.31%
	8.79%	-7.63%	-6.14%	-4.64%	-3.12%	-1.59%	-0.04%	1.52%	3.10%	4.69%	6.29%	7.92%
	9.37%	-9.06%	-7.57%	-6.07%	-4.55%	-3.01%	-1.46%	0.10%	1.68%	3.27%	4.88%	6.50%
	9.94%	-10.52%	-9.02%	-7.51%	-5.99%	-4.45%	-2.90%	-1.34%	0.24%	1.83%	3.44%	5.06%
	10.52%	-11.98%	-10.48%	-8.97%	-7.44%	-5.91%	-4.36%	-2.79%	-1.21%	0.38%	1.99%	3.61%
	11.10%	-13.46%	-11.95%	-10.44%	-8.91%	-7.37%	-5.82%	-4.26%	-2.68%	-1.08%	0.52%	2.15%
	11.68%	-14.94%	-13.43%	-11.92%	-10.39%	-8.85%	-7.29%	-5.73%	-4.15%	-2.56%	-0.95%	0.67%
	12.25%	-16.44%	-14.93%	-13.41%	-11.88%	-10.34%	-8.79%	-7.22%	-5.64%	-4.05%	-2.45%	-0.83%
	12.83%	-17.95%	-16.44%	-14.92%	-13.39%	-11.85%	-10.30%	-8.73%	-7.16%	-5.57%	-3.97%	-2.36%

Table C.2 - Investor-Level Commercial Loan IRR's

								Income Growth Rate: 2.50%				
IRR		Capitalization Rate										
		2.73%	**3.20%**	**3.67%**	**4.14%**	**4.61%**	**5.09%**	**5.56%**	**6.03%**	**6.50%**	**6.97%**	**7.44%**
Discount Rate	**4.75%**	3.40%	4.82%	6.25%	7.71%	9.18%	10.66%	12.17%	13.69%	15.23%	16.78%	18.36%
	5.33%	2.21%	3.63%	5.07%	6.53%	8.00%	9.49%	10.99%	12.52%	14.06%	15.62%	17.19%
	5.90%	1.00%	2.42%	3.86%	5.32%	6.79%	8.28%	9.79%	11.32%	12.86%	14.42%	15.99%
	6.48%	-0.24%	1.18%	2.63%	4.08%	5.56%	7.05%	8.56%	10.09%	11.63%	13.19%	14.76%
	7.06%	-1.51%	-0.08%	1.37%	2.83%	4.30%	5.79%	7.30%	8.83%	10.37%	11.93%	13.51%
	7.64%	-2.79%	-1.36%	0.09%	1.55%	3.02%	4.52%	6.03%	7.55%	9.09%	10.65%	12.23%
	8.21%	-4.09%	-2.66%	-1.21%	0.25%	1.73%	3.22%	4.73%	6.25%	7.80%	9.35%	10.93%
	8.79%	-5.40%	-3.97%	-2.52%	-1.06%	0.42%	1.91%	3.41%	4.94%	6.48%	8.04%	9.61%
	9.37%	-6.72%	-5.29%	-3.85%	-2.39%	-0.91%	0.58%	2.09%	3.61%	5.15%	6.70%	8.27%
	9.94%	-8.06%	-6.63%	-5.18%	-3.72%	-2.25%	-0.76%	0.75%	2.27%	3.80%	5.35%	6.92%
	10.52%	-9.40%	-7.97%	-6.53%	-5.07%	-3.59%	-2.11%	-0.61%	0.91%	2.45%	3.99%	5.56%
	11.10%	-10.75%	-9.32%	-7.88%	-6.42%	-4.95%	-3.46%	-1.96%	-0.45%	1.08%	2.63%	4.19%
	11.68%	-12.10%	-10.67%	-9.23%	-7.78%	-6.31%	-4.82%	-3.33%	-1.82%	-0.29%	1.25%	2.81%
	12.25%	-13.47%	-12.04%	-10.60%	-9.14%	-7.68%	-6.20%	-4.71%	-3.20%	-1.68%	-0.14%	1.41%
	12.83%	-14.84%	-13.41%	-11.97%	-10.52%	-9.06%	-7.59%	-6.10%	-4.60%	-3.09%	-1.56%	-0.02%

Table C.3 - Investor-Level Commercial Loan IRR's

						Income Growth Rate: 3.00%						
	IRR	Capitalization Rate										
		2.73%	**3.20%**	**3.67%**	**4.14%**	**4.61%**	**5.09%**	**5.56%**	**6.03%**	**6.50%**	**6.97%**	**7.44%**
Discount Rate	**4.75%**	4.89%	6.27%	7.68%	9.10%	10.54%	11.99%	13.47%	14.96%	16.47%	18.00%	19.54%
	5.33%	3.76%	5.15%	6.56%	7.98%	9.42%	10.88%	12.35%	13.84%	15.35%	16.88%	18.43%
	5.90%	2.62%	4.01%	5.41%	6.83%	8.27%	9.73%	11.20%	12.70%	14.21%	15.73%	17.28%
	6.48%	1.45%	2.84%	4.24%	5.67%	7.11%	8.56%	10.03%	11.53%	13.03%	14.56%	16.10%
	7.06%	0.27%	1.66%	3.06%	4.48%	5.92%	7.37%	8.84%	10.33%	11.84%	13.36%	14.91%
	7.64%	-0.93%	0.45%	1.86%	3.28%	4.71%	6.16%	7.63%	9.12%	10.62%	12.15%	13.69%
	8.21%	-2.15%	-0.76%	0.64%	2.06%	3.49%	4.94%	6.41%	7.89%	9.39%	10.91%	12.45%
	8.79%	-3.37%	-1.99%	-0.59%	0.83%	2.26%	3.70%	5.17%	6.65%	8.15%	9.66%	11.19%
	9.37%	-4.61%	-3.22%	-1.83%	-0.42%	1.01%	2.46%	3.92%	5.39%	6.89%	8.40%	9.93%
	9.94%	-5.85%	-4.47%	-3.07%	-1.67%	-0.24%	1.20%	2.65%	4.13%	5.62%	7.12%	8.65%
	10.52%	-7.09%	-5.72%	-4.33%	-2.92%	-1.50%	-0.06%	1.39%	2.85%	4.34%	5.84%	7.36%
	11.10%	-8.34%	-6.97%	-5.58%	-4.18%	-2.76%	-1.33%	0.11%	1.58%	3.06%	4.55%	6.06%
	11.68%	-9.59%	-8.22%	-6.84%	-5.44%	-4.03%	-2.60%	-1.16%	0.30%	1.77%	3.26%	4.76%
	12.25%	-10.85%	-9.48%	-8.10%	-6.71%	-5.30%	-3.88%	-2.45%	-1.00%	0.47%	1.95%	3.44%
	12.83%	-12.11%	-10.75%	-9.38%	-7.99%	-6.59%	-5.18%	-3.75%	-2.31%	-0.86%	0.61%	2.10%

Table C.4 - Investor-Level Commercial Loan IRR's

							Income Growth Rate: 3.50%				
IRR						Capitalization Rate					
		2.73%	3.20%	3.67%	4.14%	4.61%	5.09%	5.56%	6.03%	6.50%	6.97%	7.44%
Discount Rate	4.75%	6.29%	7.65%	9.03%	10.42%	11.83%	13.26%	14.71%	16.18%	17.66%	19.17%	20.69%
	5.33%	5.22%	6.58%	7.96%	9.35%	10.76%	12.19%	13.64%	15.11%	16.59%	18.09%	19.61%
	5.90%	4.14%	5.50%	6.87%	8.26%	9.67%	11.10%	12.55%	14.01%	15.49%	16.99%	18.51%
	6.48%	3.04%	4.39%	5.77%	7.16%	8.56%	9.99%	11.43%	12.89%	14.37%	15.87%	17.38%
	7.06%	1.92%	3.27%	4.64%	6.03%	7.43%	8.86%	10.30%	11.75%	13.23%	14.72%	16.23%
	7.64%	0.79%	2.14%	3.50%	4.89%	6.29%	7.71%	9.14%	10.60%	12.07%	13.56%	15.07%
	8.21%	-0.36%	0.99%	2.35%	3.74%	5.13%	6.55%	7.98%	9.43%	10.89%	12.38%	13.88%
	8.79%	-1.51%	-0.16%	1.20%	2.57%	3.96%	5.37%	6.80%	8.25%	9.71%	11.19%	12.69%
	9.37%	-2.67%	-1.33%	0.03%	1.40%	2.79%	4.19%	5.62%	7.05%	8.51%	9.98%	11.48%
	9.94%	-3.83%	-2.49%	-1.14%	0.22%	1.61%	3.01%	4.42%	5.85%	7.31%	8.77%	10.26%
	10.52%	-5.00%	-3.66%	-2.32%	-0.96%	0.42%	1.81%	3.22%	4.65%	6.09%	7.56%	9.03%
	11.10%	-6.16%	-4.83%	-3.49%	-2.14%	-0.77%	0.62%	2.02%	3.44%	4.88%	6.33%	7.80%
	11.68%	-7.33%	-6.01%	-4.67%	-3.32%	-1.95%	-0.57%	0.82%	2.23%	3.66%	5.11%	6.57%
	12.25%	-8.50%	-7.18%	-5.85%	-4.51%	-3.15%	-1.78%	-0.39%	1.01%	2.43%	3.87%	5.32%
	12.83%	-9.68%	-8.37%	-7.05%	-5.71%	-4.36%	-3.00%	-1.62%	-0.23%	1.18%	2.61%	4.05%

Table C.5 - Investor-Level Commercial Loan IRR's

							Income Growth Rate: 4.00%					
IRR		Capitalization Rate										
		2.73%	3.20%	3.67%	4.14%	4.61%	5.09%	5.56%	6.03%	6.50%	6.97%	7.44%
Discount Rate	4.75%	7.62%	8.96%	10.31%	11.68%	13.07%	14.48%	15.90%	17.35%	18.81%	20.29%	21.79%
	5.33%	6.61%	7.94%	9.29%	10.66%	12.05%	13.45%	14.88%	16.32%	17.78%	19.26%	20.75%
	5.90%	5.58%	6.91%	8.26%	9.62%	11.01%	12.41%	13.83%	15.27%	16.72%	18.20%	19.69%
	6.48%	4.53%	5.86%	7.20%	8.56%	9.94%	11.34%	12.76%	14.19%	15.65%	17.12%	18.61%
	7.06%	3.47%	4.79%	6.13%	7.49%	8.87%	10.26%	11.67%	13.10%	14.55%	16.02%	17.50%
	7.64%	2.39%	3.71%	5.05%	6.41%	7.78%	9.17%	10.57%	12.00%	13.44%	14.90%	16.38%
	8.21%	1.31%	2.63%	3.96%	5.31%	6.67%	8.06%	9.46%	10.88%	12.32%	13.77%	15.25%
	8.79%	0.22%	1.53%	2.86%	4.20%	5.56%	6.94%	8.34%	9.75%	11.18%	12.63%	14.10%
	9.37%	-0.87%	0.43%	1.76%	3.09%	4.45%	5.82%	7.21%	8.61%	10.04%	11.48%	12.94%
	9.94%	-1.97%	-0.67%	0.65%	1.98%	3.33%	4.69%	6.07%	7.47%	8.89%	10.32%	11.78%
	10.52%	-3.07%	-1.77%	-0.46%	0.86%	2.20%	3.56%	4.93%	6.33%	7.74%	9.16%	10.61%
	11.10%	-4.17%	-2.88%	-1.57%	-0.26%	1.08%	2.43%	3.79%	5.18%	6.58%	8.00%	9.43%
	11.68%	-5.26%	-3.98%	-2.68%	-1.37%	-0.05%	1.30%	2.66%	4.03%	5.42%	6.83%	8.26%
	12.25%	-6.36%	-5.09%	-3.80%	-2.50%	-1.18%	0.15%	1.50%	2.87%	4.25%	5.65%	7.07%
	12.83%	-7.47%	-6.21%	-4.93%	-3.63%	-2.32%	-1.00%	0.34%	1.69%	3.06%	4.45%	5.85%

Table C.6 - Investor-Level Commercial Loan IRR's

						Income Growth Rate: 4.50%						
IRR		Capitalization Rate										
		2.73%	3.20%	3.67%	4.14%	4.61%	5.09%	5.56%	6.03%	6.50%	6.97%	7.44%
Discount Rate	4.75%	8.89%	10.21%	11.54%	12.89%	14.26%	15.65%	17.05%	18.48%	19.92%	21.38%	22.86%
	5.33%	7.93%	9.24%	10.57%	11.91%	13.28%	14.66%	16.07%	17.49%	18.93%	20.38%	21.86%
	5.90%	6.94%	8.25%	9.57%	10.92%	12.28%	13.66%	15.06%	16.47%	17.91%	19.36%	20.83%
	6.48%	5.94%	7.24%	8.57%	9.90%	11.26%	12.64%	14.03%	15.44%	16.87%	18.32%	19.79%
	7.06%	4.93%	6.23%	7.54%	8.88%	10.23%	11.60%	12.99%	14.39%	15.82%	17.26%	18.72%
	7.64%	3.91%	5.20%	6.51%	7.84%	9.19%	10.55%	11.93%	13.33%	14.75%	16.19%	17.64%
	8.21%	2.88%	4.17%	5.47%	6.79%	8.13%	9.49%	10.87%	12.26%	13.67%	15.10%	16.55%
	8.79%	1.84%	3.12%	4.42%	5.74%	7.07%	8.42%	9.79%	11.18%	12.58%	14.01%	15.45%
	9.37%	0.80%	2.08%	3.37%	4.68%	6.01%	7.35%	8.71%	10.09%	11.49%	12.90%	14.34%
	9.94%	-0.24%	1.03%	2.32%	3.62%	4.94%	6.27%	7.63%	9.00%	10.39%	11.79%	13.22%
	10.52%	-1.28%	-0.02%	1.26%	2.56%	3.87%	5.19%	6.54%	7.90%	9.28%	10.68%	12.10%
	11.10%	-2.32%	-1.06%	0.21%	1.49%	2.80%	4.12%	5.45%	6.80%	8.18%	9.56%	10.97%
	11.68%	-3.36%	-2.11%	-0.85%	0.43%	1.73%	3.04%	4.37%	5.71%	7.07%	8.45%	9.85%
	12.25%	-4.40%	-3.16%	-1.90%	-0.64%	0.65%	1.95%	3.27%	4.60%	5.95%	7.32%	8.70%
	12.83%	-5.45%	-4.22%	-2.97%	-1.71%	-0.44%	0.85%	2.15%	3.47%	4.81%	6.17%	7.54%

Appendix D: Improved Commercial Loan Model Sensitivity Analysis Raw Data

Table D.1 - Investor-Level Improved Loan IRR's

							Income Growth Rate: 2.00%					
IRR		Capitalization Rate										
		2.73%	3.20%	3.67%	4.14%	4.61%	5.09%	5.56%	6.03%	6.50%	6.97%	7.44%
Discount Rate	4.75%	13.08%	14.88%	16.73%	18.63%	20.60%	22.62%	24.69%	26.83%	29.03%	31.29%	33.60%
	5.33%	11.87%	13.65%	15.48%	17.36%	19.30%	21.30%	23.35%	25.46%	27.63%	29.86%	32.15%
	5.90%	10.65%	12.41%	14.21%	16.07%	17.99%	19.96%	21.98%	24.07%	26.21%	28.42%	30.68%
	6.48%	9.42%	11.15%	12.94%	14.77%	16.66%	18.60%	20.60%	22.66%	24.78%	26.95%	29.18%
	7.06%	8.17%	9.88%	11.65%	13.46%	15.32%	17.24%	19.21%	21.24%	23.32%	25.47%	27.67%
	7.64%	6.92%	8.61%	10.35%	12.13%	13.97%	15.86%	17.80%	19.80%	21.86%	23.97%	26.15%
	8.21%	5.66%	7.33%	9.04%	10.81%	12.62%	14.48%	16.39%	18.36%	20.39%	22.47%	24.61%
	8.79%	4.40%	6.05%	7.74%	9.47%	11.26%	13.09%	14.98%	16.92%	18.91%	20.96%	23.07%
	9.37%	3.14%	4.76%	6.43%	8.14%	9.90%	11.70%	13.56%	15.47%	17.43%	19.45%	21.53%
	9.94%	1.88%	3.48%	5.12%	6.81%	8.54%	10.32%	12.15%	14.03%	15.96%	17.94%	19.98%
	10.52%	0.62%	2.20%	3.82%	5.48%	7.19%	8.94%	10.74%	12.59%	14.48%	16.44%	18.45%
	11.10%	-0.64%	0.92%	2.52%	4.16%	5.84%	7.56%	9.33%	11.15%	13.02%	14.94%	16.91%
	11.68%	-1.89%	-0.35%	1.22%	2.84%	4.49%	6.19%	7.93%	9.72%	11.56%	13.45%	15.39%
	12.25%	-3.14%	-1.62%	-0.06%	1.53%	3.16%	4.83%	6.54%	8.30%	10.11%	11.96%	13.87%
	12.83%	-4.37%	-2.87%	-1.34%	0.23%	1.83%	3.48%	5.17%	6.90%	8.67%	10.49%	12.37%

Table D.2 - Investor-Level Improved Loan IRR's

							Income Growth Rate: 2.50%				
IRR					Capitalization Rate						
	2.73%	**3.20%**	**3.67%**	**4.14%**	**4.61%**	**5.09%**	**5.56%**	**6.03%**	**6.50%**	**6.97%**	**7.44%**
Discount Rate											
4.75%	14.36%	16.14%	17.97%	19.85%	21.79%	23.79%	25.84%	27.96%	30.13%	32.36%	34.65%
5.33%	13.20%	14.95%	16.76%	18.62%	20.54%	22.51%	24.54%	26.63%	28.77%	30.98%	33.24%
5.90%	12.02%	13.76%	15.54%	17.38%	19.27%	21.21%	23.21%	25.27%	27.39%	29.57%	31.80%
6.48%	10.84%	12.55%	14.31%	16.12%	17.98%	19.90%	21.88%	23.91%	26.00%	28.14%	30.35%
7.06%	9.64%	11.33%	13.06%	14.85%	16.69%	18.58%	20.53%	22.53%	24.59%	26.70%	28.88%
7.64%	8.44%	10.10%	11.81%	13.58%	15.39%	17.25%	19.17%	21.14%	23.17%	25.25%	27.40%
8.21%	7.23%	8.87%	10.56%	12.30%	14.08%	15.92%	17.80%	19.75%	21.74%	23.80%	25.91%
8.79%	6.02%	7.64%	9.31%	11.01%	12.77%	14.58%	16.44%	18.35%	20.31%	22.34%	24.41%
9.37%	4.81%	6.41%	8.05%	9.73%	11.46%	13.24%	15.07%	16.95%	18.89%	20.87%	22.92%
9.94%	3.60%	5.18%	6.80%	8.46%	10.16%	11.91%	13.71%	15.56%	17.46%	19.41%	21.42%
10.52%	2.40%	3.95%	5.55%	7.18%	8.86%	10.58%	12.35%	14.17%	16.04%	17.96%	19.93%
11.10%	1.20%	2.73%	4.30%	5.91%	7.56%	9.26%	11.00%	12.79%	14.62%	16.51%	18.45%
11.68%	0.01%	1.52%	3.07%	4.65%	6.28%	7.94%	9.65%	11.41%	13.22%	15.07%	16.98%
12.25%	-1.18%	0.31%	1.84%	3.40%	5.00%	6.64%	8.32%	10.05%	11.82%	13.64%	15.52%
12.83%	-2.36%	-0.89%	0.62%	2.15%	3.73%	5.34%	7.00%	8.70%	10.44%	12.23%	14.07%

Table D.3 - Investor-Level Improved Loan IRR's

							Income Growth Rate: 3.00%					
	IRR	Capitalization Rate										
		2.73%	**3.20%**	**3.67%**	**4.14%**	**4.61%**	**5.09%**	**5.56%**	**6.03%**	**6.50%**	**6.97%**	**7.44%**
Discount Rate	**4.75%**	15.60%	17.35%	19.16%	21.03%	22.95%	24.92%	26.96%	29.05%	31.20%	33.41%	35.68%
	5.33%	14.47%	16.21%	18.00%	19.84%	21.73%	23.68%	25.69%	27.75%	29.88%	32.06%	34.30%
	5.90%	13.34%	15.05%	16.82%	18.63%	20.50%	22.42%	24.40%	26.44%	28.53%	30.69%	32.90%
	6.48%	12.19%	13.88%	15.62%	17.41%	19.26%	21.15%	23.10%	25.11%	27.18%	29.30%	31.48%
	7.06%	11.04%	12.71%	14.42%	16.19%	18.00%	19.87%	21.79%	23.77%	25.81%	27.90%	30.05%
	7.64%	9.88%	11.52%	13.21%	14.95%	16.74%	18.58%	20.48%	22.42%	24.43%	26.49%	28.61%
	8.21%	8.72%	10.34%	12.00%	13.72%	15.48%	17.29%	19.15%	21.07%	23.04%	25.07%	27.16%
	8.79%	7.55%	9.15%	10.79%	12.48%	14.21%	16.00%	17.83%	19.72%	21.66%	23.65%	25.70%
	9.37%	6.39%	7.97%	9.58%	11.25%	12.95%	14.71%	16.51%	18.36%	20.27%	22.23%	24.25%
	9.94%	5.23%	6.79%	8.38%	10.01%	11.69%	13.42%	15.19%	17.02%	18.89%	20.82%	22.80%
	10.52%	4.08%	5.61%	7.18%	8.79%	10.44%	12.14%	13.88%	15.67%	17.51%	19.41%	21.36%
	11.10%	2.93%	4.43%	5.98%	7.56%	9.19%	10.86%	12.57%	14.34%	16.15%	18.01%	19.92%
	11.68%	1.78%	3.27%	4.79%	6.35%	7.95%	9.59%	11.28%	13.01%	14.79%	16.62%	18.49%
	12.25%	0.65%	2.11%	3.61%	5.15%	6.72%	8.34%	9.99%	11.69%	13.44%	15.23%	17.08%
	12.83%	-0.48%	0.97%	2.44%	3.95%	5.50%	7.09%	8.72%	10.39%	12.11%	13.87%	15.68%

Table D.4 - Investor-Level Improved Loan IRR's

							Income Growth Rate: 3.50%					
IRR		Capitalization Rate										
		2.73%	3.20%	3.67%	4.14%	4.61%	5.09%	5.56%	6.03%	6.50%	6.97%	7.44%
Discount Rate	4.75%	16.79%	18.53%	20.32%	22.17%	24.07%	26.03%	28.04%	30.12%	32.25%	34.44%	36.69%
	5.33%	15.70%	17.42%	19.19%	21.01%	22.89%	24.82%	26.81%	28.85%	30.95%	33.12%	35.34%
	5.90%	14.60%	16.30%	18.04%	19.84%	21.69%	23.59%	25.55%	27.57%	29.64%	31.78%	33.97%
	6.48%	13.49%	15.17%	16.89%	18.66%	20.48%	22.36%	24.29%	26.28%	28.32%	30.42%	32.58%
	7.06%	12.38%	14.03%	15.72%	17.47%	19.27%	21.11%	23.02%	24.97%	26.99%	29.06%	31.18%
	7.64%	11.26%	12.88%	14.56%	16.28%	18.04%	19.86%	21.74%	23.66%	25.64%	27.68%	29.78%
	8.21%	10.14%	11.74%	13.39%	15.08%	16.82%	18.61%	20.45%	22.35%	24.30%	26.30%	28.37%
	8.79%	9.01%	10.59%	12.21%	13.88%	15.59%	17.36%	19.17%	21.03%	22.95%	24.92%	26.95%
	9.37%	7.89%	9.45%	11.05%	12.69%	14.37%	16.10%	17.89%	19.72%	21.60%	23.54%	25.54%
	9.94%	6.77%	8.31%	9.88%	11.49%	13.15%	14.86%	16.61%	18.41%	20.26%	22.17%	24.13%
	10.52%	5.66%	7.17%	8.72%	10.31%	11.94%	13.62%	15.34%	17.11%	18.93%	20.80%	22.72%
	11.10%	4.56%	6.04%	7.57%	9.13%	10.73%	12.38%	14.07%	15.81%	17.60%	19.44%	21.33%
	11.68%	3.46%	4.92%	6.42%	7.96%	9.54%	11.16%	12.82%	14.53%	16.28%	18.09%	19.94%
	12.25%	2.36%	3.81%	5.28%	6.80%	8.35%	9.94%	11.58%	13.25%	14.98%	16.75%	18.57%
	12.83%	1.28%	2.70%	4.16%	5.65%	7.17%	8.74%	10.35%	11.99%	13.69%	15.42%	17.21%

Table D.5 - Investor-Level Improved Loan IRR's

							Income Growth Rate: 4.00%					
	IRR	**Capitalization Rate**										
		2.73%	**3.20%**	**3.67%**	**4.14%**	**4.61%**	**5.09%**	**5.56%**	**6.03%**	**6.50%**	**6.97%**	**7.44%**
Discount Rate	**4.75%**	17.94%	19.67%	21.45%	23.28%	25.16%	27.10%	29.10%	31.15%	33.27%	35.44%	37.67%
	5.33%	16.89%	18.59%	20.34%	22.15%	24.01%	25.92%	27.89%	29.92%	32.00%	34.15%	36.35%
	5.90%	15.82%	17.50%	19.23%	21.01%	22.84%	24.73%	26.67%	28.67%	30.73%	32.84%	35.01%
	6.48%	14.75%	16.40%	18.11%	19.86%	21.67%	23.53%	25.44%	27.41%	29.43%	31.52%	33.66%
	7.06%	13.66%	15.30%	16.98%	18.71%	20.49%	22.32%	24.20%	26.14%	28.13%	30.18%	32.29%
	7.64%	12.58%	14.19%	15.84%	17.55%	19.30%	21.10%	22.95%	24.86%	26.82%	28.84%	30.92%
	8.21%	11.49%	13.08%	14.71%	16.38%	18.11%	19.88%	21.70%	23.58%	25.51%	27.50%	29.54%
	8.79%	10.41%	11.97%	13.57%	15.22%	16.92%	18.66%	20.46%	22.30%	24.20%	26.15%	28.16%
	9.37%	9.32%	10.86%	12.44%	14.06%	15.73%	17.45%	19.21%	21.02%	22.89%	24.81%	26.78%
	9.94%	8.24%	9.76%	11.31%	12.91%	14.55%	16.24%	17.97%	19.75%	21.58%	23.47%	25.40%
	10.52%	7.17%	8.66%	10.19%	11.76%	13.37%	15.03%	16.73%	18.48%	20.28%	22.13%	24.04%
	11.10%	6.10%	7.57%	9.07%	10.62%	12.20%	13.83%	15.51%	17.23%	18.99%	20.81%	22.68%
	11.68%	5.04%	6.48%	7.97%	9.49%	11.05%	12.65%	14.29%	15.98%	17.71%	19.50%	21.33%
	12.25%	3.98%	5.41%	6.87%	8.36%	9.90%	11.47%	13.08%	14.74%	16.44%	18.19%	19.99%
	12.83%	2.94%	4.34%	5.78%	7.25%	8.76%	10.30%	11.89%	13.52%	15.19%	16.91%	18.67%

Table D.6 - Investor-Level Improved Loan IRR's

							Income Growth Rate: 4.50%				
IRR	Capitalization Rate										
	2.73%	**3.20%**	**3.67%**	**4.14%**	**4.61%**	**5.09%**	**5.56%**	**6.03%**	**6.50%**	**6.97%**	**7.44%**
Discount Rate											
4.75%	19.06%	20.77%	22.54%	24.35%	26.22%	28.15%	30.13%	32.17%	34.27%	36.42%	38.63%
5.33%	18.03%	19.73%	21.46%	23.26%	25.10%	27.00%	28.95%	30.96%	33.03%	35.16%	37.34%
5.90%	17.00%	18.67%	20.38%	22.15%	23.96%	25.83%	27.76%	29.74%	31.78%	33.88%	36.03%
6.48%	15.95%	17.60%	19.29%	21.03%	22.82%	24.66%	26.56%	28.51%	30.52%	32.58%	34.70%
7.06%	14.90%	16.52%	18.19%	19.90%	21.67%	23.48%	25.35%	27.27%	29.25%	31.28%	33.37%
7.64%	13.85%	15.45%	17.09%	18.77%	20.51%	22.30%	24.13%	26.02%	27.97%	29.97%	32.02%
8.21%	12.80%	14.37%	15.98%	17.64%	19.35%	21.11%	22.91%	24.77%	26.69%	28.65%	30.68%
8.79%	11.74%	13.29%	14.88%	16.52%	18.19%	19.92%	21.70%	23.53%	25.41%	27.34%	29.33%
9.37%	10.69%	12.22%	13.78%	15.39%	17.04%	18.74%	20.48%	22.28%	24.13%	26.03%	27.98%
9.94%	9.65%	11.15%	12.69%	14.27%	15.89%	17.56%	19.28%	21.04%	22.85%	24.72%	26.64%
10.52%	8.60%	10.08%	11.60%	13.15%	14.75%	16.39%	18.07%	19.81%	21.59%	23.42%	25.30%
11.10%	7.57%	9.02%	10.51%	12.04%	13.61%	15.22%	16.88%	18.58%	20.33%	22.13%	23.98%
11.68%	6.54%	7.97%	9.44%	10.94%	12.49%	14.07%	15.70%	17.37%	19.08%	20.85%	22.66%
12.25%	5.52%	6.93%	8.38%	9.85%	11.37%	12.93%	14.52%	16.16%	17.85%	19.58%	21.36%
12.83%	4.51%	5.90%	7.32%	8.78%	10.27%	11.80%	13.37%	14.98%	16.63%	18.33%	20.08%

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